

RAMSEY

by  **SRO TECHNOLOGY**

Micro-Tech 9000
Communication Protocols
MT 9100, 9101, 9105, 9301
Reference Manual

REC-4490

English Language

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Revision History

Revision	Date Released	Details of the Release
	Mar 16 2026	Completed review and testing of 9100, 9101, 9105 and 9301 controllers Ethernet/IP, Modbus TCP, Modbus RTU and ProfiBus communications protocols.

Glossary

Summary of Terms used in Communication Protocols

Overview The following table lists out all the parameters used in the Modbus, EtherNet/IP and ProfiBus registers. This table must be used in combination with the Modbus, EtherNet/IP and ProfiBus registers to understand what the data being sent to the PLC means.

Item	Description
Alarms	The alarms are visible on the display and can be acknowledged and reset through keyboard, digital input or serial line.
Analog Output Value	The mA values being driven on the analog outputs.
Auto Zero Max Dev	The current value of auto zero maximum deviation.
AZ Deviation	The current value of auto-zero deviation.
AZT Correction	The AZT function accurately tracks the zero of the scale, by calculating an additional zero constant. The portion of zero due to AZT is not incorporated in the zero constant, but is shown separately.
AZT step limit	The current value of auto zero-tracking step.
Batch Deviation	The maximum acceptable deviation from the batch set point. Usually entered by the user.
Batch Number	The number of the currently running load out or the number of the last finished one. The integrator automatically increments the batch number when a new batch is started.
Batch Preact	The set point of the pre-act for the current or the next Load Out. Entered or downloaded by the user (if in Manual mode) or calculated by the integrator. Defines when the Load Out has to stop to compensate the queue of material from the loading point to the scale.
Batch Preset	The pre-set point for the current or the next batch (load out). Set by the user. Defines when the rate is lowered to increase batch accuracy.
Batch Setpoint	The set point for the current or the next batch (Load Out). Usually entered or downloaded by the user. The value is updated only when a batch is started.
Batch Total	The current contents of the Load Out totalizer. Usually read at end of batch to check the result of the Load Out. This register is automatically cleared when a new batch is started.
Belt Warm	The current value of belt warm-up time.
Cal Error	Indicates in percent, the zero or span error computed at the end of a remote calibration function. The master can evaluate it before accepting the result of a remote “autozero” or “autospan”.
Command	Commands like Reset Alarms, Set Tare, Reset Tare, Batch Start, Batch Abort, Batch Standby. These commands are different for each controller.
Control Deviation	Deviation between the setpoint (desired feed rate) and the actual/controlled feed rate (process variable).
Control Out	Controller output can be manually changed from 0 to 100%, when the Auto/Manual selection is Manual.
Control Setpoint Local	Set to “Local” control.
Control Setpoint Serial	Set to “Serial In” control.
Current Calibration Number	The active or most recently established zero calibration reference value.
Density	The bulk density (or material density) of the product being fed, usually in units like kg/m ³ .
Density capacity	This is the maximum design or rated bulk density the weighbelt feeder system is calibrated/configured for.
Derivative (Rate) Time	The Derivative Time (rate) function responds to the speed and direction of the process deviation. In most belt-feeder applications, the Derivative Time function is set to zero, which turns off the function.

Item	Description
Display Line	Contains the messages actually shown on the display of the instrument in form of an ASCII string.
Displayed Setpoint	The currently active target feed rate setpoint.
Gross Weight	The total weight measured by the load cells/scale.
High Load Set	The set point for the alarm of high belt loading in percent of the Belt Load Capacity value. Entered or downloaded by the user.
High Negative Deviation	Set the percent level and the delay time.
High Positive Deviation	Set the percent level and the delay time.
High Rate Set	The set point for the alarm of high rate in percent of the Scale Capacity value. Entered or downloaded by the user.
High Speed Set	The set point for the alarm of high speed in percent of the Belt Speed Capacity value. Entered or downloaded by the user.
High-High Negative Deviation	Set the percent level and the delay time.
High-High Positive Deviation	Set the percent level and the delay time.
I/O (Input/Output)	The values being read into the controller, or outputs being set by the controller.
Integral (Reset) Time	The reset action responds to a combination of the amount and duration of the process deviation. Integral time sets the slope of the output correction signal. A 100% change in the process variable results in a 100% change in the output correction signal at the integral time entered. Entering a zero (0) time turns off the integral function.
Last Key Pressed	Records the most recent key (button) pressed on the front panel keypad.
Load	The instantaneous belt load in engineering units.
Load Cell Capacity	The load-cell capacity of the integrator. Entered at first start up, should never be altered.
Load Cell Signal mV	Displays the mV signal from the load cell.
Low Load Set	The set point for the alarm of low belt loading in percent of the Belt Load Capacity value. Entered or downloaded by the user.
Low Rate Set	The set point for the alarm of low rate in percent of the Scale Capacity value. Entered or downloaded by the user.
Low Speed Set	The set point for the alarm of low speed in percent of the Belt Speed Capacity value. Entered or downloaded by the user.
Master Total	The current value of the master totalizer of the Micro-Tech.
Maximum Scale Capacity	The current maximum scale capacity, expressed as a rate—for example, tons per hour (Tph).
Model ID	The Model of the controller being communicated with (9100, 9101, 9105, 9301).
Net Weight	The weight of material only (gross weight minus tare/empty weight of the weighing assembly).
Number Of Trials	The number of audit trails to print. Entered or downloaded by the user. An integer value 1 to 999.
Operator Total	The current value of the operator totalizer of the Micro-Tech. Operator total can be zeroed by writing zero to this register.
Peak Weight	The instantaneous value of Peak Weight.
Process Variable Damping	The process variable damping averages the process variable to avoid undesired jumps of the control output.
Product Ratio	The ratio setpoint or proportion for the material being fed by this specific weighbelt feeder.
Proportional Control Band	The amount of change that will occur when the controller looks at the deviation from the process variable to the setpoint.
Rate	The instantaneous rate in engineering units as currently displayed on the Run screen.
Reset Total	The current value of the reset totalizer of the Micro-Tech. Reset total can be zeroed by writing zero to this register.
Scale Capacity	The scale capacity of the scale. Entered by the user at first start up, should never be altered.
Set Control Value	The desired production rate that the controller aims to achieve and maintain through the PID/P.E.I.C. control algorithm.

Item	Description
Set Digital Output	Drive the digital outputs to a specific value.
Span Number	Indicate the span in use in the scale.
Specific Weight	Specific weight is the weight of a substance per unit volume, calculated as the product of its density and the acceleration due to gravity.
Speed	The instantaneous belt speed in engineering units.
Speed Capacity	The speed capacity of the integrator. Entered or acquired at first start up, should never be altered.
Start Delay	The Start Delay is the time in seconds the controller output remains at the set or locked value, after a restart or Run command is received.
Status	Indicates the status of the controller. Refer to the specific status registers for each product as it varies.
Status LED	The status LEDs above the display, when lighted, alert you to the fact that the Micro-Tech is currently in Alarm, Calibration or Normal operation. This register contains the current status of the LEDs (On or Off).
Success Flag	Set to 0 after a message has been received and properly processed. If a message is correctly received but cannot be processed because password protection or size error, this flag is set to 1. The user may read this register after a write message to ensure the data has been accepted.
Threshold 1-4	The set point for the alarm of threshold 1-4. Entered or downloaded by the operator.
Total AZ %	The current value of total auto-zero %.
Zero Number	Indicate the zero in use in the scale.
Zero Reference	The current value of the zero reference.

Table 1 – Communication glossary

Micro-Tech 9100

Static Weight Indicator Communication Options

Overview

This section provides information on communication options and setup for the Micro-Tech 9100 Feeder Controller (Static Weight Indicator).

Communication Protocol Options

Communication Protocol						Siemens 3964R Allen-Bradley DF1
Supported by Ramsey	Yes	Yes	Yes	No	No	No
Standard Communication Option	Yes	Yes	Yes	No. Profibus comms does not work on 9100 controller. 3 rd Party Protocol Converter Required	No – 3 rd Party Protocol Converter Required	Legacy Protocol and Not Supported by Ramsey
Communication Layer	Ethernet	Ethernet	Serial RS485 Full Duplex (4 Wire)	Serial	Ethernet	Serial
9105 Controller Software	142.00.01.09	142.00.01.09	142.00.01.09	142.00.01.09	142.00.01.09	142.00.01.09
Communication Setup File	EDS_9100_142_00_01_09.eds			----	----	----
Setup Requirements	IP Address Mask Address Gateway Address	IP Address Mask Address Gateway Address	Device Address Baud Rate Parity Stop Bits Data Size	See Profibus protocol convertor instructions. Use Modbus TCP or Ethernet/IP setup instructions.	See ProfiNet protocol convertor instructions. Use Modbus TCP or Ethernet/IP setup instructions.	These legacy communication options may work but have not been tested by Ramsey.

EtherNet/IP **Micro-Tech 9100 Ethernet/IP Register Table**

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9100 are as follows.

- **REC4278** 9100 9200 Static Weight Indicator Reference – All languages and all revisions.
- **REC4279** 9100 9200 Static Weight Indicator User Manual – All languages and all revisions.

Software Version Information

This version of the Ethernet/IP Register has only been tested with the most recent 9100 software version **142.00.01.09**

These Ethernet/IP registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 142.00.01.09 is available as a software update, please contact your Ramsey distributor.

EDS Version Information

This version of the 9100 software must use the following Electronic Data Sheet (EDS) file, it is the only version of the Ethernet/IP EDS file that has been tested with the 9100 software version 142.00.01.09.

- **EDS_9100_142_00_01_09.eds**

This EDS file is available, please contact your Ramsey distributor. Updating the EDS file on the PLC may require modifications to the connected PLC program if using older software versions of the 9100.

Ethernet/IP Setup Information

Ethernet/IP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Ethernet/IP Device Identity Parameters

The Device Identity Parameters are the core identification attributes from the Common Industrial Protocol (CIP) Identity Object used by scanners to electronically key and recognize the exact device model during connection establishment. These are found in the EDS file for the 9100 controller, but listed below as well.

- Vendor ID = 1322
- Device Type = 43
- Major Revision = 2
- Minor Revision = 20
- Product Name = 9100

**Ethernet/IP
Assembly
Instance
Parameters**

The Assembly Instance Parameters define the cyclic I/O data blocks exchanged over EtherNet/IP implicit connections, specifying the Input Assembly Instance (9100 → PLC), Output Assembly Instance (PLC → 9100), and Configuration Assembly Instance, along with their respective data sizes and byte ordering. This information can be found, or calculated, from the EDS file for the 9100 controller, but listed below as well.

Configuration

- Assembly Instance = 1
- Data Size = 0 bytes (8 bits)

Output

- Assembly Instance = 112
- Data Size = 160 bytes (8 bits)

Input

- Assembly Instance = 100
- Data Size = 396 bytes (8 bits)

**Ethernet/IP
Data Timing**

From power on, the Ethernet/IP connection will take approximately 30 seconds to be established. The Requested Packet Interval (RPI) must be set to 100ms minimum.

Input Data Table – The Input data table contains information that is read from the 9100 by the connected PLC.

Instance	Offset	Scale	Description	Access	Format	Type	Bit Position	Description	Type
Input	0	All	Status LED	Read	U16	Integer	0	Zero LED 4 (Green Solid)	Bool
							1	Alarm LED 3 (Red Flash)	Bool
							2	Stable LED 2 (Green Solid)	Bool
							3	Ready LED 1 (Green Solid)	Bool
							4-15	Not Used	Bool
Input	1	1	Status 1	Read	U16	Integer	0	Success Flag	Bool
							1-3	Not Used	Bool
							4	Threshold 4	Bool
							5	Threshold 3	Bool
							6	Threshold 2	Bool
							7	Threshold 1	Bool
							8	Ready	Bool
							9	Not Used	Bool
							10	Tare Acquired	Bool
							11	Center of Zero (Zero)	Bool
							12	Weight Stable	Bool
							13	Calibration Running	Bool
							14	Cumulative Alarms (an alarm is pending)	Bool
							15	Cumulative Alarms (a shutdown is pending)	Bool
							Input	2	1
Input	3	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	4	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	5	All	Alarms 1	Read	U16	Integer	0	Threshold 2 - (Multiscale: Scale 1)	Bool
							1	Threshold 2 (Single Scale)	Bool
							2	Threshold 1 - (Multiscale: Scale 5)	Bool
							3	Threshold 1 - (Multiscale: Scale 4)	Bool
							4	Threshold 1 - (Multiscale: Scale 3)	Bool

							5	Threshold 1 - (Multiscale: Scale 2)	Bool
							6	Threshold 1 - (Multiscale: Scale 1)	Bool
							7	Threshold 1 (Single Scale)	Bool
							8	Not Used	Bool
							9	Not Used	Bool
							10	Excitation Cell Fail 4 - (Scale/Channel 4)	Bool
							11	Excitation Cell Fail 3 - (Scale/Channel 3)	Bool
							12	Excitation Cell Fail 2 - (Scale/Channel 2)	Bool
							13	Excitation Cell Fail 1 - (Scale/Channel 1)	Bool
							14	Excitation Cell Fail (Single Scale)	Bool
							15	Clock Fail	Bool
Input	6	All	Alarms 2	Read	U16	Integer	0	Threshold 4 - (Multiscale: Scale 5)	Bool
							1	Threshold 4 - (Multiscale: Scale 4)	Bool
							2	Threshold 4 - (Multiscale: Scale 3)	Bool
							3	Threshold 4 - (Multiscale: Scale 2)	Bool
							4	Threshold 4 - (Multiscale: Scale 1)	Bool
							5	Threshold 4 (Single Scale)	Bool
							6	Threshold 3 - (Multiscale: Scale 5)	Bool
							7	Threshold 3 - (Multiscale: Scale 4)	Bool
							8	Threshold 3 - (Multiscale: Scale 3)	Bool
							9	Threshold 3 - (Multiscale: Scale 2)	Bool
							10	Threshold 3 - (Multiscale: Scale 1)	Bool
							11	Threshold 3 (Single Scale)	Bool
							12	Threshold 2 - (Multiscale: Scale 5)	Bool
							13	Threshold 2 - (Multiscale: Scale 4)	Bool
							14	Threshold 2 - (Multiscale: Scale 3)	Bool
							15	Threshold 2 - (Multiscale: Scale 2)	Bool
Input	7	All	Alarms 3	Read	U16	Integer	0	Autozero Tracking Over Limit 4 - (Multiscale: Scale 4)	Bool
							1	Autozero Tracking Over Limit 3 - (Multiscale: Scale 3)	Bool

							2	Autozero Tracking Over Limit 2 - (Multiscale: Scale 2)	Bool
							3	Autozero Tracking Over Limit 1 - (Multiscale: Scale 1)	Bool
							4	Autozero Tracking Over Limit (Single Scale)	Bool
							5	External Alarm 3	Bool
							6	External Alarm 2	Bool
							7	External Alarm 1	Bool
							8	Calibration Time Elapsed 4 - (Multiscale: Scale 4)	Bool
							9	Calibration Time Elapsed 3 - (Multiscale: Scale 3)	Bool
							10	Calibration Time Elapsed 2 - (Multiscale: Scale 2)	Bool
							11	Calibration Time Elapsed 1 - (Multiscale: Scale 1)	Bool
							12	Calibration Time Elapsed (Single Scale)	Bool
							13	Power During Calibration	Bool
							14	Cold Start	Bool
							15	Warm Start	Bool
Input	8	All	Alarms 4	Read	U16	Integer	0	Signal Cell Fail 2 - (Multiscale: Scale/Channel 2)	Bool
							1	Signal Cell Fail 1 - (Multiscale: Scale/Channel 1)	Bool
							2	Signal Cell Fail (Single Scale)	Bool
							3	Cells Imbalance	Bool
							4	ProfiBus Error	Bool
							5	Not Used	Bool
							6	Communication Error	Bool
							7	Printer Error	Bool
							8	Math Error	Bool
							9-11	Not Used	Bool
							12	HW configuration Changed Slot 4	Bool
							13	HW configuration Changed Slot 3	Bool
							14	HW configuration Changed Slot 2	Bool

							15	HW configuration Changed Slot 1	Bool
Input	9	All	Alarms 5	Read	U16	Integer	0-13	Not Used	Bool
							14	Signal Cell Fail 4 - (Multiscale: Scale/Channel 4)	Bool
							15	Signal Cell Fail 3 - (Multiscale: Scale/Channel 3)	Bool
Input	10	All	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
Input	11	All	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
							1	Input 2 - Digital 8In/8Out Board #1	Bool
							2	Input 3 - Digital 8In/8Out Board #1	Bool
							3	Input 4 - Digital 8In/8Out Board #1	Bool
							4	Input 5 - Digital 8In/8Out Board #1	Bool
							5	Input 6 - Digital 8In/8Out Board #1	Bool
							6	Input 7 - Digital 8In/8Out Board #1	Bool
							7	Input 8 - Digital 8In/8Out Board #1	Bool
							8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
							9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
							10	Input 3 - Digital Input Board	Bool
							11	Input 4 - Digital Input Board	Bool
							12	Input 5 - Digital Input Board	Bool
							13-15	Not Used	Bool
Input	12	All	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
							2	Output 1 - Digital Input Board	Bool
							3	Output 2 - Digital Input Board	Bool
							4	Output 3 - Digital Input Board	Bool
							5	Output 4 - Digital Input Board	Bool
							6-7	Not Used	Bool
							8	Input 1 - Digital 8In/8Out Board #2	Bool
							9	Input 2 - Digital 8In/8Out Board #2	Bool
							10	Input 3 - Digital 8In/8Out Board #2	Bool

							11	Input 4 - Digital 8In/8Out Board #2	Bool
							12	Input 5 - Digital 8In/8Out Board #2	Bool
							13	Input 6 - Digital 8In/8Out Board #2	Bool
							14	Input 7 - Digital 8In/8Out Board #2	Bool
							15	Input 8 - Digital 8In/8Out Board #2	Bool
Input	13	All	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
							1	Output 2 - Digital 8In/8Out Board #2	Bool
							2	Output 3 - Digital 8In/8Out Board #2	Bool
							3	Output 4 - Digital 8In/8Out Board #2	Bool
							4	Output 5 - Digital 8In/8Out Board #2	Bool
							5	Output 6 - Digital 8In/8Out Board #2	Bool
							6	Output 7 - Digital 8In/8Out Board #2	Bool
							7	Output 8 - Digital 8In/8Out Board #2	Bool
							8	Output 1 - Digital 8In/8Out Board #1	Bool
							9	Output 2 - Digital 8In/8Out Board #1	Bool
							10	Output 3 - Digital 8In/8Out Board #1	Bool
							11	Output 4 - Digital 8In/8Out Board #1	Bool
							12	Output 5 - Digital 8In/8Out Board #1	Bool
							13	Output 6 - Digital 8In/8Out Board #1	Bool
							14	Output 7 - Digital 8In/8Out Board #1	Bool
							15	Output 8 - Digital 8In/8Out Board #1	Bool
Input	14	1	Free Space	Read	U16	Integer			
Input	15	1	Free Space	Read	U16	Integer			
Input	16	1	Free Space	Read	U16	Integer			
Input	17	1	Free Space	Read	U16	Integer			
Input	18	1	Net Weight	Read	IEEE754 Big-endian	Float			
Input	20	1	Gross Weight	Read	IEEE754 Big-endian	Float			
Input	22	1	Peak Weight	Read	IEEE754 Big-endian	Float			

Input	24	1	Master Total	Read	IEEE754 Big-endian	Float			
Input	26	1	Reset Total	Read	IEEE754 Big-endian	Float			
Input	28	1	Threshold 1	Read	IEEE754 Big-endian	Float			
Input	30	1	Threshold 2	Read	IEEE754 Big-endian	Float			
Input	32	1	Threshold 3	Read	IEEE754 Big-endian	Float			
Input	34	1	Threshold 4	Read	IEEE754 Big-endian	Float			
Input	36	1	Load cell Signal mV	Read	IEEE754 Big-endian	Float			
Input	38	1	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	40	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	42	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	44	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	46	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	48	2	Status 1	Read	U16	Integer	0	Success Flag	Bool
							1-3	Not Used	Bool
							4	Threshold 4	Bool
							5	Threshold 3	Bool
							6	Threshold 2	Bool
							7	Threshold 1	Bool
							8	Ready	Bool
							9	Not Used	Bool
							10	Tare Acquired	Bool
							11	Center of Zero (Zero)	Bool
							12	Weight Stable	Bool

							13	Calibration Running	Bool
							14	Cumulative Alarms (an alarm is pending)	Bool
							15	Cumulative Alarms (a shutdown is pending)	Bool
Input	49	2	Status 2	Read	U16	Integer	0-15	Not Used	Bool
Input	50	2	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	51	2	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	52	2	Free Space	Read	U16	Integer			
Input	53	2	Free Space	Read	U16	Integer			
Input	54	2	Free Space	Read	U16	Integer			
Input	55	2	Free Space	Read	U16	Integer			
Input	56	2	Net Weight	Read	IEEE754 Big-endian	Float			
Input	58	2	Gross Weight	Read	IEEE754 Big-endian	Float			
Input	60	2	Peak Weight	Read	IEEE754 Big-endian	Float			
Input	62	2	Master Total	Read	IEEE754 Big-endian	Float			
Input	64	2	Reset Total	Read	IEEE754 Big-endian	Float			
Input	66	2	Threshold 1	Read	IEEE754 Big-endian	Float			
Input	68	2	Threshold 2	Read	IEEE754 Big-endian	Float			
Input	70	2	Threshold 3	Read	IEEE754 Big-endian	Float			
Input	72	2	Threshold 4	Read	IEEE754 Big-endian	Float			
Input	74	2	Load cell Signal mV	Read	IEEE754 Big-endian	Float			
Input	76	2	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	78	2	Free Space	Read	IEEE754 Big-endian	Float			

Input	80	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	82	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	84	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	86	3	Status 1	Read	U16	Integer	0 1-3 4 5 6 7 8 9 10 11 12 13 14 15	Success Flag Not Used Threshold 4 Threshold 3 Threshold 2 Threshold 1 Ready Not Used Tare Acquired Center of Zero (Zero) Weight Stable Calibration Running Cumulative Alarms (an alarm is pending) Cumulative Alarms (a shutdown is pending)	Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool
Input	87	3	Status 2	Read	U16	Integer	0-15	Not Used	Bool
Input	88	3	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	89	3	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	90	3	Free Space	Read	U16	Integer			
Input	91	3	Free Space	Read	U16	Integer			
Input	92	3	Free Space	Read	U16	Integer			
Input	93	3	Free Space	Read	U16	Integer			
Input	94	3	Net Weight	Read	IEEE754 Big-endian	Float			
Input	96	3	Gross Weight	Read	IEEE754 Big-endian	Float			
Input	98	3	Peak Weight	Read	IEEE754 Big-endian	Float			

Input	100	3	Master Total	Read	IEEE754 Big-endian	Float			
Input	102	3	Reset Total	Read	IEEE754 Big-endian	Float			
Input	104	3	Threshold 1	Read	IEEE754 Big-endian	Float			
Input	106	3	Threshold 2	Read	IEEE754 Big-endian	Float			
Input	108	3	Threshold 3	Read	IEEE754 Big-endian	Float			
Input	110	3	Threshold 4	Read	IEEE754 Big-endian	Float			
Input	112	3	Load cell Signal mV	Read	IEEE754 Big-endian	Float			
Input	114	3	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	116	3	Free Space	Read	IEEE754 Big-endian	Float			
Input	118	3	Free Space	Read	IEEE754 Big-endian	Float			
Input	120	3	Free Space	Read	IEEE754 Big-endian	Float			
Input	122	3	Free Space	Read	IEEE754 Big-endian	Float			
Input	124	4	Status 1	Read	U16	Integer	0	Success Flag	Bool
							1-3	Not Used	Bool
							4	Threshold 4	Bool
							5	Threshold 3	Bool
							6	Threshold 2	Bool
							7	Threshold 1	Bool
							8	Ready	Bool
							9	Not Used	Bool
							10	Tare Acquired	Bool
							11	Center of Zero (Zero)	Bool
							12	Weight Stable	Bool

							13	Calibration Running	Bool
							14	Cumulative Alarms (an alarm is pending)	Bool
							15	Cumulative Alarms (a shutdown is pending)	Bool
Input	125	4	Status 2	Read	U16	Integer	0-15	Not Used	Bool
Input	126	4	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	127	4	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	128	4	Free Space	Read	U16	Integer			
Input	129	4	Free Space	Read	U16	Integer			
Input	130	4	Free Space	Read	U16	Integer			
Input	131	4	Free Space	Read	U16	Integer			
Input	132	4	Net Weight	Read	IEEE754 Big-endian	Float			
Input	134	4	Gross Weight	Read	IEEE754 Big-endian	Float			
Input	136	4	Peak Weight	Read	IEEE754 Big-endian	Float			
Input	138	4	Master Total	Read	IEEE754 Big-endian	Float			
Input	140	4	Reset Total	Read	IEEE754 Big-endian	Float			
Input	142	4	Threshold 1	Read	IEEE754 Big-endian	Float			
Input	144	4	Threshold 2	Read	IEEE754 Big-endian	Float			
Input	146	4	Threshold 3	Read	IEEE754 Big-endian	Float			
Input	148	4	Threshold 4	Read	IEEE754 Big-endian	Float			
Input	150	4	Load cell Signal mV	Read	IEEE754 Big-endian	Float			
Input	152	4	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	154	4	Free Space	Read	IEEE754 Big-endian	Float			

Input	156	4	Free Space	Read	IEEE754 Big-endian	Float			
Input	158	4	Free Space	Read	IEEE754 Big-endian	Float			
Input	160	4	Free Space	Read	IEEE754 Big-endian	Float			
Input	162	5	Status 1	Read	U16	Integer	0 1-3 4 5 6 7 8 9 10 11 12 13 14 15	Success Flag Not Used Threshold 4 Threshold 3 Threshold 2 Threshold 1 Ready Not Used Tare Acquired Center of Zero (Zero) Weight Stable Calibration Running Cumulative Alarms (an alarm is pending) Cumulative Alarms (a shutdown is pending)	Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool
Input	163	5	Status 2	Read	U16	Integer	0-15	Not Used	Bool
Input	164	5	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	165	5	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	166	5	Free Space	Read	U16	Integer			
Input	167	5	Free Space	Read	U16	Integer			
Input	168	5	Free Space	Read	U16	Integer			
Input	169	5	Free Space	Read	U16	Integer			
Input	170	5	Net Weight	Read	IEEE754 Big-endian	Float			
Input	172	5	Gross Weight	Read	IEEE754 Big-endian	Float			
Input	174	5	Peak Weight	Read	IEEE754 Big-endian	Float			

Input	176	5	Master Total	Read	IEEE754 Big-endian	Float			
Input	178	5	Reset Total	Read	IEEE754 Big-endian	Float			
Input	180	5	Threshold 1	Read	IEEE754 Big-endian	Float			
Input	182	5	Threshold 2	Read	IEEE754 Big-endian	Float			
Input	184	5	Threshold 3	Read	IEEE754 Big-endian	Float			
Input	186	5	Threshold 4	Read	IEEE754 Big-endian	Float			
Input	188	5	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	190	5	Free Space	Read	IEEE754 Big-endian	Float			
Input	192	5	Free Space	Read	IEEE754 Big-endian	Float			
Input	194	5	Free Space	Read	IEEE754 Big-endian	Float			
Input	196	5	Free Space	Read	IEEE754 Big-endian	Float			

Table 2 – Ethernet/IP 9100 Input Table

Output Data Table – The Output data table contains information that is written from the PLC to the 9105.

Instance	Offset	Scale	Description	Access	Format	Type	Bit Position	Description	Type
Output	0	1	Command	Write	U32	Long Integer	0-15	Not Used	Bool
							0	Reset Alarms	Bool
							1	Set Tare	Bool
							2	Reset Tare	Bool
							3	Update Totals	Bool
							4	Clear Reset Totals	Bool
							5	Clear Peak	Bool
							6-15	Unused	Bool

Output	2	1	Free Space	Write	U16	Integer			
Output	3	1	Free Space	Write	U16	Integer			
Output	4	1	Threshold 1	Write	IEEE754 Big-endian	Float			
Output	6	1	Threshold 2	Write	IEEE754 Big-endian	Float			
Output	8	1	Threshold 3	Write	IEEE754 Big-endian	Float			
Output	10	1	Threshold 4	Write	IEEE754 Big-endian	Float			
Output	12	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	14	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	16	2	Command	Write	U32	Long Integer	0-15 0 1 2 3 4 5 6-15	Not Used Reset Alarms Set Tare Reset Tare Update Totals Clear Reset Totals Clear Peak Unused	Bool Bool Bool Bool Bool Bool Bool
Output	18	2	Free Space	Write	U16	Integer			
Output	19	2	Free Space	Write	U16	Integer			
Output	20	2	Threshold 1	Write	IEEE754 Big-endian	Float			
Output	22	2	Threshold 2	Write	IEEE754 Big-endian	Float			
Output	24	2	Threshold 3	Write	IEEE754 Big-endian	Float			
Output	26	2	Threshold 4	Write	IEEE754 Big-endian	Float			
Output	28	2	Free Space	Write	IEEE754 Big-endian	Float			

Output	30	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	32	3	Command	Write	U32	Long Integer	0-15 0 1 2 3 4 5 6-15	Not Used Reset Alarms Set Tare Reset Tare Update Totals Clear Reset Totals Clear Peak Unused	Bool Bool Bool Bool Bool Bool Bool
Output	34	3	Free Space	Write	U16	Integer			
Output	35	3	Free Space	Write	U16	Integer			
Output	36	3	Threshold 1	Write	IEEE754 Big-endian	Float			
Output	38	3	Threshold 2	Write	IEEE754 Big-endian	Float			
Output	40	3	Threshold 3	Write	IEEE754 Big-endian	Float			
Output	42	3	Threshold 4	Write	IEEE754 Big-endian	Float			
Output	44	3	Free Space	Write	IEEE754 Big-endian	Float			
Output	46	3	Free Space	Write	IEEE754 Big-endian	Float			
Output	48	4	Command	Write	U32	Long Integer	0-15 0 1 2 3 4 5 6-15	Not Used Reset Alarms Set Tare Reset Tare Update Totals Clear Reset Totals Clear Peak Unused	Bool Bool Bool Bool Bool Bool Bool
Output	50	4	Free Space	Write	U16	Integer			

Output	51	4	Free Space	Write	U16	Integer			
Output	52	4	Threshold 1	Write	IEEE754 Big-endian	Float			
Output	54	4	Threshold 2	Write	IEEE754 Big-endian	Float			
Output	56	4	Threshold 3	Write	IEEE754 Big-endian	Float			
Output	58	4	Threshold 4	Write	IEEE754 Big-endian	Float			
Output	60	4	Free Space	Write	IEEE754 Big-endian	Float			
Output	62	4	Free Space	Write	IEEE754 Big-endian	Float			
Output	64	5	Command	Write	U32	Long Integer	0-15 0 1 2 3 4 5 6-15	Not Used Reset Alarms Set Tare Reset Tare Update Totals Clear Reset Totals Clear Peak Unused	Bool Bool Bool Bool Bool Bool Bool
Output	66	5	Free Space	Write	U16	Integer			
Output	67	5	Free Space	Write	U16	Integer			
Output	68	5	Threshold 1	Write	IEEE754 Big-endian	Float			
Output	70	5	Threshold 2	Write	IEEE754 Big-endian	Float			
Output	72	5	Threshold 3	Write	IEEE754 Big-endian	Float			
Output	74	5	Threshold 4	Write	IEEE754 Big-endian	Float			
Output	76	5	Free Space	Write	IEEE754 Big-endian	Float			
Output	78	5	Free Space	Write	IEEE754 Big-endian	Float			

Table 3 – Ethernet/IP 9100 Output Table



Micro-Tech 9100 Modbus TCP Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9100 are as follows.

- **REC4278** 9100 9200 Static Weight Indicator Reference – All languages and all revisions.
- **REC4279** 9100 9200 Static Weight Indicator User Manual – All languages and all revisions.

Software Version Information

This version of the Modbus Register has only been tested with the most recent 9100 software version **142.00.01.09**

These Modbus TCP registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 142.00.01.09 is available as a software update, please contact your Ramsey distributor.

Modbus TCP Setup Information

The Modbus TCP Ethernet connection is established over port 502 and does not require a Slave ID to function. Modbus TCP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Modbus TCP Data Read

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

The Micro-Tech 9100 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9100 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9100 will return an error or provide incorrect data.

Modbus TCP Data Write

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9100. This may also cause the 9100 to become non-responsive and require a reboot.

Modbus Register	Scale	Description	Access	Format	Type	Bit Position	Description	Type
40001-40010	All	Display Line 1 – Total of 20 Characters over the first display line	Read	U16	Integer(s)	0-7	Each 16bit Modbus register contains 2x 8bit Characters	Char
						8-15		Char
40011-40020	All	Display Line 2 - Total of 20 Characters over the second display line	Read	U16	Integer(s)	0-7	Each 16bit Modbus register contains 2x 8bit Characters	Char
						8-15		Char
40021-40030	All	Display Line 3 - Total of 20 Characters over the third display line	Read	U16	Integer(s)	0-7	Each 16bit Modbus register contains 2x 8bit Characters	Char
						8-15		Char
40031-40040	All	Display Line 4 - Total of 20 Characters over the fourth display line	Read	U16	Integer(s)	0-7	Each 16bit Modbus register contains 2x 8bit Characters	Char
						8-15		Char
40041-40080	All	Display Line 5 - Total of 80 Characters over the fifth display line,	Read	U16	Integer(s)	0-7	Each 16bit Modbus register contains 2x 8bit Characters	Char
						8-15		Char
40081	All	Status LED	Read	U16	Integer	0	Zero LED 4 (Green Solid) Alarm LED 3 (Red Flash) Stable LED 2 (Green Solid) Ready LED 1 (Green Solid) Not Used	Bool
						1		Bool
						2		Bool
						3		Bool
						4-15		Bool
40082	1	Status 1	Read	U16	Integer	0	Success Flag Not Used Threshold 4 Threshold 3	Bool
						1-3		Bool
						4		Bool
						5		Bool
								Bool

						6	Threshold 2	Bool
						7	Threshold 1	Bool
						8	Ready	Bool
						9	Not Used	Bool
						10	Tare Acquired	Bool
						11	Center of Zero (Zero)	Bool
						12	Weight Stable	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms (an alarm is pending)	Bool
						15	Cumulative Alarms (a shutdown is pending)	Bool
40083	1	Status 2	Read	U16	Integer	0-15	Not Used	Bool
40084	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40085	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40086	All	Alarms 1	Read	U16	Integer	0	Threshold 2 - (Multiscale: Scale 1)	Bool
						1	Threshold 2 (Single Scale)	Bool
						2	Threshold 1 - (Multiscale: Scale 5)	Bool
						3	Threshold 1 - (Multiscale: Scale 4)	Bool
						4	Threshold 1 - (Multiscale: Scale 3)	Bool
						5	Threshold 1 - (Multiscale: Scale 2)	Bool
						6	Threshold 1 - (Multiscale: Scale 1)	Bool
						7	Threshold 1 (Single Scale)	Bool
						8	Not Used	Bool
						9	Not Used	Bool
						10	Excitation Cell Fail 4 - (Scale/Channel 4)	Bool
						11	Excitation Cell Fail 3 - (Scale/Channel 3)	Bool
						12	Excitation Cell Fail 2 - (Scale/Channel 2)	Bool
						13	Excitation Cell Fail 1 - (Scale/Channel 1)	Bool
						14	Excitation Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
40087	All	Alarms 2	Read	U16	Integer	0	Threshold 4 - (Multiscale: Scale 5)	Bool
						1	Threshold 4 - (Multiscale: Scale 4)	Bool

						2	Threshold 4 - (Multiscale: Scale 3)	Bool
						3	Threshold 4 - (Multiscale: Scale 2)	Bool
						4	Threshold 4 - (Multiscale: Scale 1)	Bool
						5	Threshold 4 (Single Scale)	Bool
						6	Threshold 3 - (Multiscale: Scale 5)	Bool
						7	Threshold 3 - (Multiscale: Scale 4)	Bool
						8	Threshold 3 - (Multiscale: Scale 3)	Bool
						9	Threshold 3 - (Multiscale: Scale 2)	Bool
						10	Threshold 3 - (Multiscale: Scale 1)	Bool
						11	Threshold 3 (Single Scale)	Bool
						12	Threshold 2 - (Multiscale: Scale 5)	Bool
						13	Threshold 2 - (Multiscale: Scale 4)	Bool
						14	Threshold 2 - (Multiscale: Scale 3)	Bool
						15	Threshold 2 - (Multiscale: Scale 2)	Bool
40088	All	Alarms 3	Read	U16	Integer	0	Autozero Tracking Over Limit 4 - (Multiscale: Scale 4)	Bool
						1	Autozero Tracking Over Limit 3 - (Multiscale: Scale 3)	Bool
						2	Autozero Tracking Over Limit 2 - (Multiscale: Scale 2)	Bool
						3	Autozero Tracking Over Limit 1 - (Multiscale: Scale 1)	Bool
						4	Autozero Tracking Over Limit (Single Scale)	Bool
						5	External Alarm 3	Bool
						6	External Alarm 2	Bool
						7	External Alarm 1	Bool
						8	Calibration Time Elapsed 4 - (Multiscale: Scale 4)	Bool
						9	Calibration Time Elapsed 3 - (Multiscale: Scale 3)	Bool
						10	Calibration Time Elapsed 2 - (Multiscale: Scale 2)	Bool
						11	Calibration Time Elapsed 1 - (Multiscale: Scale 1)	Bool

						12	Calibration Time Elapsed (Single Scale)	Bool
						13	Power During Calibration	Bool
						14	Cold Start	Bool
						15	Warm Start	Bool
40089	All	Alarms 4	Read	U16	Integer	0	Signal Cell Fail 2 - (Multiscale: Scale/Channel 2)	Bool
						1	Signal Cell Fail 1 - (Multiscale: Scale/Channel 1)	Bool
						2	Signal Cell Fail (Single Scale)	Bool
						3	Cells Imbalance	Bool
						4	ProfiBus Error	Bool
						5	Not Used	Bool
						6	Communication Error	Bool
						7	Printer Error	Bool
						8	Math Error	Bool
						9-11	Not Used	Bool
						12	HW configuration Changed Slot 4	Bool
						13	HW configuration Changed Slot 3	Bool
						14	HW configuration Changed Slot 2	Bool
						15	HW configuration Changed Slot 1	Bool
						40090	All	Alarms 5
14	Signal Cell Fail 4 - (Multiscale: Scale/Channel 4)	Bool						
15	Signal Cell Fail 3 - (Multiscale: Scale/Channel 3)	Bool						
40091	All	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
40092	All	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool

						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
40093	All	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
40094	All	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool

						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool
						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
40095	1	Command 1	Write	U16	Integer	0	Reset Alarms	Bool
						1	Set Tare	Bool
						2	Reset Tare	Bool
						3	Update Totals	Bool
						4	Clear Reset Totals	Bool
						5	Clear Peak	Bool
						6-15	Unused	Bool
40096	1	Command 2	Write	U16	Integer	0-15	Not Used	Bool
40097	All	Last Key Pressed	Write	U16	Integer			
40098	1	Free Space	Read	U16	Integer			
40099	1	Free Space	Read	U16	Integer			
40100	1	Free Space	Read	U16	Integer			
40101	1	Free Space	Read	U16	Integer			
40102	All	Model ID	Read	U16	Integer			
40103	1	Free Space	Read	U16	Integer			
40104	1	Free Space	Read	U16	Integer			
40105	1	Free Space	Read	U16	Integer			
40106	1	Net Weight	Read	IEEE754 Big-endian	Float			
40108	1	Gross Weight	Read	IEEE754 Big-endian	Float			
40110	1	Peak Weight	Read	IEEE754 Big-endian	Float			
40112	1	Master Total	Read	IEEE754 Big-endian	Float			

40114	1	Reset Total	Read	IEEE754 Big-endian	Float			
40116	1	Threshold 1	Read/ Write	IEEE754 Big-endian	Float			
40118	1	Threshold 2	Read/ Write	IEEE754 Big-endian	Float			
40120	1	Threshold 3	Read/ Write	IEEE754 Big-endian	Float			
40122	1	Threshold 4	Read/ Write	IEEE754 Big-endian	Float			
40124	1	Load Cell Capacity (mV)	Read	IEEE754 Big-endian	Float			
40126	1	Scale Capacity	Read	IEEE754 Big-endian	Float			
40128	1	Free Space	Read	IEEE754 Big-endian	Float			
40130	1	Free Space	Read	IEEE754 Big-endian	Float			
40132	1	Free Space	Read	IEEE754 Big-endian	Float			
40134	1	Free Space	Read	IEEE754 Big-endian	Float			
40136	1	Free Space	Read	IEEE754 Big-endian	Float			
40138	1	Free Space	Read	IEEE754 Big-endian	Float			
40140	1	Free Space	Read	IEEE754 Big-endian	Float			
40142	1	Free Space	Read	IEEE754 Big-endian	Float			
40144	2	Status 1	Read	U16	Integer	0 1-3 4 5 6 7	Success Flag Not Used Threshold 4 Threshold 3 Threshold 2 Threshold 1	Bool Bool Bool Bool Bool Bool

						8	Ready	Bool
						9	Not Used	Bool
						10	Tare Acquired	Bool
						11	Center of Zero (Zero)	Bool
						12	Weight Stable	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms (an alarm is pending)	Bool
						15	Cumulative Alarms (a shutdown is pending)	Bool
40145	2	Status 2	Read	U16	Integer	0-15	Not Used	Bool
40146	2	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40147	2	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40148	2	Command 1	Write	U16	Integer	0	Reset Alarms	Bool
						1	Set Tare	Bool
						2	Reset Tare	Bool
						3	Update Totals	Bool
						4	Clear Reset Totals	Bool
						5	Clear Peak	Bool
						6-15	Unused	Bool
40149	2	Command 2	Write	U16	Integer	0-15	Not Used	Bool
40150	2	Free Space	Read	U16	Integer			
40151	2	Free Space	Read	U16	Integer			
40152	2	Free Space	Read	U16	Integer			
40153	2	Free Space	Read	U16	Integer			
40154	2	Free Space	Read	U16	Integer			
40155	2	Free Space	Read	U16	Integer			
40156	2	Free Space	Read	U16	Integer			
40157	2	Free Space	Read	U16	Integer			
40158	2	Net Weight	Read	IEEE754 Big-endian	Float			
40160	2	Gross Weight	Read	IEEE754 Big-endian	Float			

40162	2	Peak Weight	Read	IEEE754 Big-endian	Float			
40164	2	Master Total	Read	IEEE754 Big-endian	Float			
40166	2	Reset Total	Read	IEEE754 Big-endian	Float			
40168	2	Threshold 1	Read/ Write	IEEE754 Big-endian	Float			
40170	2	Threshold 2	Read/ Write	IEEE754 Big-endian	Float			
40172	2	Threshold 3	Read/ Write	IEEE754 Big-endian	Float			
40174	2	Threshold 4	Read/ Write	IEEE754 Big-endian	Float			
40176	2	Load Cell Capacity (mV)	Read	IEEE754 Big-endian	Float			
40178	2	Scale Capacity	Read	IEEE754 Big-endian	Float			
40180	2	Free Space	Read	IEEE754 Big-endian	Float			
40182	2	Free Space	Read	IEEE754 Big-endian	Float			
40184	2	Free Space	Read	IEEE754 Big-endian	Float			
40186	2	Free Space	Read	IEEE754 Big-endian	Float			
40188	2	Free Space	Read	IEEE754 Big-endian	Float			
40190	2	Free Space	Read	IEEE754 Big-endian	Float			
40192	2	Free Space	Read	IEEE754 Big-endian	Float			
40194	2	Free Space	Read	IEEE754 Big-endian	Float			
40196	3	Status 1	Read	U16	Integer	0 1-3 4	Success Flag Not Used Threshold 4	Bool Bool Bool

						5	Threshold 3	Bool
						6	Threshold 2	Bool
						7	Threshold 1	Bool
						8	Ready	Bool
						9	Not Used	Bool
						10	Tare Acquired	Bool
						11	Center of Zero (Zero)	Bool
						12	Weight Stable	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms (an alarm is pending)	Bool
						15	Cumulative Alarms (a shutdown is pending)	Bool
40197	3	Status 2	Read	U16	Integer	0-15	Not Used	Bool
40198	3	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40199	3	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40200	3	Command 1	Write	U16	Integer	0	Reset Alarms	Bool
						1	Set Tare	Bool
						2	Reset Tare	Bool
						3	Update Totals	Bool
						4	Clear Reset Totals	Bool
						5	Clear Peak	Bool
						6-15	Unused	Bool
40201	3	Command 2	Write	U16	Integer	0-15	Not Used	Bool
40202	3	Free Space	Read	U16	Integer			
40203	3	Free Space	Read	U16	Integer			
40204	3	Free Space	Read	U16	Integer			
40205	3	Free Space	Read	U16	Integer			
40206	3	Free Space	Read	U16	Integer			
40207	3	Free Space	Read	U16	Integer			
40208	3	Free Space	Read	U16	Integer			
40209	3	Free Space	Read	U16	Integer			

40210	3	Net Weight	Read	IEEE754 Big-endian	Float			
40212	3	Gross Weight	Read	IEEE754 Big-endian	Float			
40214	3	Peak Weight	Read	IEEE754 Big-endian	Float			
40216	3	Master Total	Read	IEEE754 Big-endian	Float			
40218	3	Reset Total	Read	IEEE754 Big-endian	Float			
40220	3	Threshold 1	Read/ Write	IEEE754 Big-endian	Float			
40222	3	Threshold 2	Read/ Write	IEEE754 Big-endian	Float			
40224	3	Threshold 3	Read/ Write	IEEE754 Big-endian	Float			
40226	3	Threshold 4	Read/ Write	IEEE754 Big-endian	Float			
40228	3	Load Cell Capacity (mV)	Read	IEEE754 Big-endian	Float			
40230	3	Scale Capacity	Read	IEEE754 Big-endian	Float			
40232	3	Free Space	Read	IEEE754 Big-endian	Float			
40234	3	Free Space	Read	IEEE754 Big-endian	Float			
40236	3	Free Space	Read	IEEE754 Big-endian	Float			
40238	3	Free Space	Read	IEEE754 Big-endian	Float			
40240	3	Free Space	Read	IEEE754 Big-endian	Float			
40242	3	Free Space	Read	IEEE754 Big-endian	Float			
40244	3	Free Space	Read	IEEE754 Big-endian	Float			
40246	3	Free Space	Read	IEEE754 Big-endian	Float			

40248	4	Status 1	Read	U16	Integer	0	Success Flag	Bool
						1-3	Not Used	Bool
						4	Threshold 4	Bool
						5	Threshold 3	Bool
						6	Threshold 2	Bool
						7	Threshold 1	Bool
						8	Ready	Bool
						9	Not Used	Bool
						10	Tare Acquired	Bool
						11	Center of Zero (Zero)	Bool
						12	Weight Stable	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms (an alarm is pending)	Bool
						15	Cumulative Alarms (a shutdown is pending)	Bool
						40249	4	Status 2
40250	4	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40251	4	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40252	4	Command 1	Write	U16	Integer	0	Reset Alarms	Bool
						1	Set Tare	Bool
						2	Reset Tare	Bool
						3	Update Totals	Bool
						4	Clear Reset Totals	Bool
						5	Clear Peak	Bool
						6-15	Unused	Bool
40253	4	Command 2	Write	U16	Integer	0-15	Not Used	Bool
40254	4	Free Space	Read	U16	Integer			
40255	4	Free Space	Read	U16	Integer			
40256	4	Free Space	Read	U16	Integer			
40257	4	Free Space	Read	U16	Integer			
40258	4	Free Space	Read	U16	Integer			
40259	4	Free Space	Read	U16	Integer			

40260	4	Free Space	Read	U16	Integer			
40261	4	Free Space	Read	U16	Integer			
40262	4	Net Weight	Read	IEEE754 Big-endian	Float			
40264	4	Gross Weight	Read	IEEE754 Big-endian	Float			
40266	4	Peak Weight	Read	IEEE754 Big-endian	Float			
40268	4	Master Total	Read	IEEE754 Big-endian	Float			
40270	4	Reset Total	Read	IEEE754 Big-endian	Float			
40272	4	Threshold 1	Read/ Write	IEEE754 Big-endian	Float			
40274	4	Threshold 2	Read/ Write	IEEE754 Big-endian	Float			
40276	4	Threshold 3	Read/ Write	IEEE754 Big-endian	Float			
40278	4	Threshold 4	Read/ Write	IEEE754 Big-endian	Float			
40280	4	Load Cell Capacity (mV)	Read	IEEE754 Big-endian	Float			
40282	4	Scale Capacity	Read	IEEE754 Big-endian	Float			
40284	4	Free Space	Read	IEEE754 Big-endian	Float			
40286	4	Free Space	Read	IEEE754 Big-endian	Float			
40288	4	Free Space	Read	IEEE754 Big-endian	Float			
40290	4	Free Space	Read	IEEE754 Big-endian	Float			
40292	4	Free Space	Read	IEEE754 Big-endian	Float			
40294	4	Free Space	Read	IEEE754 Big-endian	Float			

40296	4	Free Space	Read	IEEE754 Big-endian	Float			
40298	4	Free Space	Read	IEEE754 Big-endian	Float			
40300	5	Status 1	Read	U16	Integer	0 1-3 4 5 6 7 8 9 10 11 12 13 14 15	Success Flag Not Used Threshold 4 Threshold 3 Threshold 2 Threshold 1 Ready Not Used Tare Acquired Center of Zero (Zero) Weight Stable Calibration Running Cumulative Alarms (an alarm is pending) Cumulative Alarms (a shutdown is pending)	Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool
40301	5	Status 2	Read	U16	Integer	0-15	Not Used	Bool
40302	5	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40303	5	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40304	5	Command 1	Write	U16	Integer	0 1 2 3 4 5 6-15	Reset Alarms Set Tare Reset Tare Update Totals Clear Reset Totals Clear Peak Unused	Bool Bool Bool Bool Bool Bool Bool
40305	5	Command 2	Write	U16	Integer	0-15	Not Used	Bool
40306	5	Free Space	Read	U16	Integer			
40307	5	Free Space	Read	U16	Integer			

40308	5	Free Space	Read	U16	Integer		
40309	5	Free Space	Read	U16	Integer		
40310	5	Free Space	Read	U16	Integer		
40311	5	Free Space	Read	U16	Integer		
40312	5	Free Space	Read	U16	Integer		
40313	5	Free Space	Read	U16	Integer		
40314	5	Net Weight	Read	IEEE754 Big-endian	Float		
40316	5	Gross Weight	Read	IEEE754 Big-endian	Float		
40318	5	Peak Weight	Read	IEEE754 Big-endian	Float		
40320	5	Master Total	Read	IEEE754 Big-endian	Float		
40322	5	Reset Total	Read	IEEE754 Big-endian	Float		
40324	5	Threshold 1	Read/ Write	IEEE754 Big-endian	Float		
40326	5	Threshold 2	Read/ Write	IEEE754 Big-endian	Float		
40328	5	Threshold 3	Read/ Write	IEEE754 Big-endian	Float		
40330	5	Threshold 4	Read/ Write	IEEE754 Big-endian	Float		
40332	5	Scale Capacity	Read	IEEE754 Big-endian	Float		
40334	5	Free Space	Read	IEEE754 Big-endian	Float		
40336	5	Free Space	Read	IEEE754 Big-endian	Float		
40338	5	Free Space	Read	IEEE754 Big-endian	Float		
40340	5	Free Space	Read	IEEE754 Big-endian	Float		
40342	5	Free Space	Read	IEEE754 Big-endian	Float		

40344	5	Free Space	Read	IEEE754 Big-endian	Float			
40346	5	Free Space	Read	IEEE754 Big-endian	Float			
40348	5	Free Space	Read	IEEE754 Big-endian	Float			

Table 4 – Modbus TCP Register Table



Micro-Tech 9100 Modbus RTU Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9100 are as follows.

- **REC4278** 9100 9200 Static Weight Indicator Reference – All languages and all revisions.
- **REC4279** 9100 9200 Static Weight Indicator User Manual – All languages and all revisions.

Software Version Information

This version of the Modbus Register has only been tested with the most recent 9100 software version **142.00.01.09**

These Modbus RTU registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 142.00.01.09 is available as a software update, please contact your Ramsey distributor.

Modbus RTU HMI Setup Information

The Modbus RTU connection is established over serial RS485 4 wire. Modbus RTU does not need to be turned on in the Micro-Tech controller, just connect the serial cable and set the information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 5” appears in the LCD display.
- Press the softkey button under the **CommA** text on the screen to enter the Serial setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - Baud Rate = XXXX (9600 default, user defined).
 - Parity = XX (No Parity default, user defined).
 - Stop Bits = XX (1 default, user defined).
 - Word Length = XX (8 default, user defined).
 - Protocol = Modbus
 - Address = XX (1 default, user defined).

Modbus RTU Hardware Setup Information

NOTE – RS485 Full Duplex (4 wire) protocol has been successfully verified and tested by Ramsey. RS485 Half Duplex (2 wire) has been tested by Ramsey and does not work reliably on the 9105 or 9205.

From the factory, the default jumper position is set for RS232, which was used to connect a printer. For Modbus RTU communications, the jumpers need to be set for RS485 Full Duplex (4 wire) as per the following table.

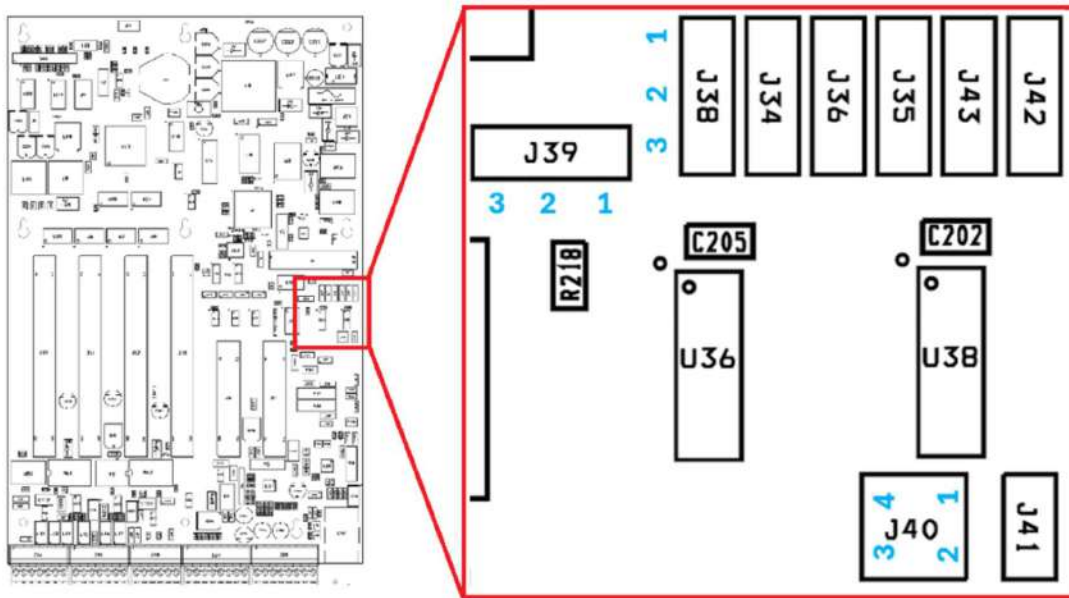


Figure 1 – RS485 4 Wire Jumper Positions

Jumper	J39	J38	J34	J36	J35	J43	J43	J40
RS485 4 Wire – No Termination Resistors	2-3	1-2	1-2	2-3	2-3	1-2	1-2	3-4
RS485 4 Wire – With 120ohm Termination Resistor	2-3	1-2	1-2	2-3	2-3	1-2	1-2	1-2
RS485 4 Wire – With 120ohm Termination Resistor and 600ohm Pull up / Pull Down Bias Resistors	2-3	1-2	1-2	2-3	2-3	2-3	2-3	1-2

Table 5 – RS485 4 Wire Jumper Positions

**Modbus RTU
Data Read**

NOTE – The Modbus RTU implementation does not transmit any of the display information and only transmits information on Scale 1. Data for Scale 2, 3, 4 or 5 is not transmitted over Modbus RTU. If this information is required, then you must use Modbus TCP or Ethernet/IP communication options. The Modbus RTU registers start at Modbus register 40074.

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

The Micro-Tech 9105 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9105 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9105 will return an error or provide incorrect data.

Modbus RTU Data Write

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9105. This may also cause the 9105 to become non-responsive and require a reboot.

Modbus Register	Scale	Description	Access	Format	Type	Bit Position	Description	Type
40074	All	Status LED	Read	U16	Integer	0	Zero LED 4 (Green Solid)	Bool
						1	Alarm LED 3 (Red Flash)	Bool
						2	Stable LED 2 (Green Solid)	Bool
						3	Ready LED 1 (Green Solid)	Bool
						4-15	Not Used	Bool
40075	1	Status 1	Read	U16	Integer	0	Success Flag	Bool
						1-3	Not Used	Bool
						4	Threshold 4	Bool
						5	Threshold 3	Bool
						6	Threshold 2	Bool
						7	Threshold 1	Bool
						8	Ready	Bool
						9	Not Used	Bool
						10	Tare Acquired	Bool
						11	Center of Zero (Zero)	Bool
						12	Weight Stable	Bool

						13	Calibration Running	Bool
						14	Cumulative Alarms (an alarm is pending)	Bool
						15	Cumulative Alarms (a shutdown is pending)	Bool
40076	1	Status 2	Read	U16	Integer	0-15	Not Used	Bool
40077	All	Alarms 1	Read	U16	Integer	0	Threshold 2 - (Multiscale: Scale 1)	Bool
						1	Threshold 2 (Single Scale)	Bool
						2	Threshold 1 - (Multiscale: Scale 5)	Bool
						3	Threshold 1 - (Multiscale: Scale 4)	Bool
						4	Threshold 1 - (Multiscale: Scale 3)	Bool
						5	Threshold 1 - (Multiscale: Scale 2)	Bool
						6	Threshold 1 - (Multiscale: Scale 1)	Bool
						7	Threshold 1 (Single Scale)	Bool
						8	Not Used	Bool
						9	Not Used	Bool
						10	Excitation Cell Fail 4 - (Scale/Channel 4)	Bool
						11	Excitation Cell Fail 3 - (Scale/Channel 3)	Bool
						12	Excitation Cell Fail 2 - (Scale/Channel 2)	Bool
						13	Excitation Cell Fail 1 - (Scale/Channel 1)	Bool
						14	Excitation Cell Fail (Single Scale)	Bool
15	Clock Fail	Bool						
40078	All	Alarms 2	Read	U16	Integer	0	Threshold 4 - (Multiscale: Scale 5)	Bool
						1	Threshold 4 - (Multiscale: Scale 4)	Bool
						2	Threshold 4 - (Multiscale: Scale 3)	Bool
						3	Threshold 4 - (Multiscale: Scale 2)	Bool
						4	Threshold 4 - (Multiscale: Scale 1)	Bool
						5	Threshold 4 (Single Scale)	Bool
						6	Threshold 3 - (Multiscale: Scale 5)	Bool
						7	Threshold 3 - (Multiscale: Scale 4)	Bool
						8	Threshold 3 - (Multiscale: Scale 3)	Bool
						9	Threshold 3 - (Multiscale: Scale 2)	Bool
						10	Threshold 3 - (Multiscale: Scale 1)	Bool

						11	Threshold 3 (Single Scale)	Bool
						12	Threshold 2 - (Multiscale: Scale 5)	Bool
						13	Threshold 2 - (Multiscale: Scale 4)	Bool
						14	Threshold 2 - (Multiscale: Scale 3)	Bool
						15	Threshold 2 - (Multiscale: Scale 2)	Bool
40079	All	Alarms 3	Read	U16	Integer	0	Autozero Tracking Over Limit 4 - (Multiscale: Scale 4)	Bool
						1	Autozero Tracking Over Limit 3 - (Multiscale: Scale 3)	Bool
						2	Autozero Tracking Over Limit 2 - (Multiscale: Scale 2)	Bool
						3	Autozero Tracking Over Limit 1 - (Multiscale: Scale 1)	Bool
						4	Autozero Tracking Over Limit (Single Scale)	Bool
						5	External Alarm 3	Bool
						6	External Alarm 2	Bool
						7	External Alarm 1	Bool
						8	Calibration Time Elapsed 4 - (Multiscale: Scale 4)	Bool
						9	Calibration Time Elapsed 3 - (Multiscale: Scale 3)	Bool
						10	Calibration Time Elapsed 2 - (Multiscale: Scale 2)	Bool
						11	Calibration Time Elapsed 1 - (Multiscale: Scale 1)	Bool
						12	Calibration Time Elapsed (Single Scale)	Bool
						13	Power During Calibration	Bool
						14	Cold Start	Bool
15	Warm Start	Bool						
40080	All	Alarms 4	Read	U16	Integer	0	Signal Cell Fail 2 - (Multiscale: Scale/Channel 2)	Bool
						1	Signal Cell Fail 1 - (Multiscale: Scale/Channel 1)	Bool
						2	Signal Cell Fail (Single Scale)	Bool
						3	Cells Imbalance	Bool
						4	ProfiBus Error	Bool

						5	Not Used	Bool
						6	Communication Error	Bool
						7	Printer Error	Bool
						8	Math Error	Bool
						9-11	Not Used	Bool
						12	HW configuration Changed Slot 4	Bool
						13	HW configuration Changed Slot 3	Bool
						14	HW configuration Changed Slot 2	Bool
						15	HW configuration Changed Slot 1	Bool
40081	All	Alarms 5	Read	U16	Integer	0-13	Not Used	Bool
						14	Signal Cell Fail 4 - (Multiscale: Scale/Channel 4)	Bool
						15	Signal Cell Fail 3 - (Multiscale: Scale/Channel 3)	Bool
40082	All	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
40083	All	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool

						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
40084	All	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool
						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
40085	All	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
40086	All	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
40087	All	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
40088	All	I/O 7	Read	U16	Integer	0-15	Not Used	Bool

40089	All	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
40090	All	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
40091	All	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
40092	All	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
40093	All	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
40094	1	Command 1	Write	U16	Integer	0	Reset Alarms	Bool
						1	Set Tare	Bool
						2	Reset Tare	Bool
						3	Update Totals	Bool
						4	Clear Reset Totals	Bool
						5	Clear Peak	Bool
6-15	Unused	Bool						
40095	1	Net Weight	Read	IEEE754 Big-endian	Float			
40097	1	Gross Weight	Read	IEEE754 Big-endian	Float			
40099	1	Peak Weight	Read	IEEE754 Big-endian	Float			
40101	1	Master Total	Read	IEEE754 Big-endian	Float			
40103	1	Reset Total	Read	IEEE754 Big-endian	Float			
40105	1	Scale Capacity	Read	IEEE754 Big-endian	Float			
40107	1	Threshold 1	Read/ Write	IEEE754 Big-endian	Float			
40109	1	Threshold 2	Read/ Write	IEEE754 Big-endian	Float			
40111	1	Threshold 3	Read/ Write	IEEE754 Big-endian	Float			
40113	1	Threshold 4	Read/ Write	IEEE754 Big-endian	Float			

Table 6 – Modbus RTU Register Table






Micro-Tech 9101

Belt Scale Integrator Communication Options

Overview

This section provides information on communication options and setup for the Micro-Tech 9101 Belt Scale Integrator.

Communication Protocol Options

Communication Protocol						Siemens 3964R Allen-Bradley DF1
Supported by Ramsey	Yes	Yes	Yes	Yes	No	No
Standard Communication Option	Yes	Yes	Yes	Yes - Ramsey Option Card Required (Part number 102936)	No – 3 rd Party Protocol Convertor Required	Legacy Protocol and Not Supported by Ramsey
Communication Layer	Ethernet	Ethernet	Serial RS485 Full Duplex (4 Wire)	Serial	Ethernet	Serial
9101 Controller Software	140.00.04.10	140.00.04.10	140.00.04.10	140.00.04.10	140.00.04.10	140.00.04.10
Communication Setup File	EDS_9101_140_00_04_10.eds			GSD_9101_140_00_04_10.gsd	----	----
Setup Requirements	IP Address Mask Address Gateway Address	IP Address Mask Address Gateway Address	Device Address Baud Rate Parity Stop Bits Data Size	Slot Number Device Address	See ProfiNet protocol convertor instructions. Use Modbus TCP or Ethernet/IP setup instructions.	These legacy communication options may work but have not been tested by Ramsey.

EtherNet/IP **Micro-Tech 9101 Ethernet/IP Register Table**

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9101 are as follows.

- **REC4281** 9101 9201 Integrator Reference Manual – All languages and all revisions.
- **REC4282** 9101 9201 Integrator User Manual – All languages and all revisions.

Software Version Information

This version of the Ethernet/IP Register has only been tested with the most recent 9101 software version **140.00.04.10**

These Ethernet/IP registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 140.00.04.10 is available as a software update, please contact your Ramsey distributor.

EDS Version Information

This version of the 9101 software must use the following Electronic Data Sheet (EDS) file, it is the only version of the Ethernet/IP EDS file that has been tested with the 9101 software version 140.00.04.10

- **EDS_9101_140_00_04_10.eds**

This EDS file is available, please contact your Ramsey distributor. Updating the EDS file on the PLC may require modifications to the connected PLC program if using older software versions of the 9101.

Ethernet/IP Setup Information

Ethernet/IP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Ethernet/IP Device Identity Parameters

The Device Identity Parameters are the core identification attributes from the Common Industrial Protocol (CIP) Identity Object used by scanners to electronically key and recognize the exact device model during connection establishment. These are found in the EDS file for the 9101 controller, but listed below as well.

- Vendor ID = 1322
- Device Type = 43
- Major Revision = 2
- Minor Revision = 40
- Product Name = 9101

**Ethernet/IP
Assembly
Instance
Parameters**

The Assembly Instance Parameters define the cyclic I/O data blocks exchanged over EtherNet/IP implicit connections, specifying the Input Assembly Instance (9101 → PLC), Output Assembly Instance (PLC → 9101), and Configuration Assembly Instance, along with their respective data sizes and byte ordering. This information can be found, or calculated, from the EDS file for the 9101 controller, but listed below as well.

Configuration

- Assembly Instance = 1
- Data Size = 0 bytes (8 bits)

Output

- Assembly Instance = 112
- Data Size = 260 bytes (8 bits)

Input

- Assembly Instance = 100
- Data Size = 416 bytes (8 bits)

**Ethernet/IP
Data Timing**

From power on, the Ethernet/IP connection will take approximately 30 seconds to be established. The Requested Packet Interval (RPI) must be set to 100ms minimum.

Input Data Table – The Input data table contains information that is read from the 9105 by the connected PLC.

Instance	Offset	Scale	Description	Access	Format	Type	Bit Position	Description	Type
Input	0	Both	Success Flag	Read	U16	Integer			
Input	1	Both	Status LED	Read	U16	Integer	0	Ready LED 1 (Green Solid)	Bool
							1	Batch LED 2 (Green)	Bool
							2	Alarm LED 3 (Red Flash)	Bool
							3	Zero or Span Calibration LED 4 (Red Solid)	Bool
							4	Zero w LED 1 (Green Solid)	Bool
							5-15	Not Used	Bool
Input	2	1	Status 1	Read	U16	Integer	0-1	Not Used	Bool
							2	Flag Low Speed	Bool
							3	Flag High Speed	Bool
							4	Flag Low Rate	Bool
							5	Flag High Rate	Bool
							6	Flag Low Load	Bool
							7	Flag High Load	Bool
							8-12	Not Used	Bool
							13	Calibration Running	Bool
							14	Cumulative Alarms Active	Bool
							15	Cumulative Shut Down Active	Bool
Input	3	1	Status 2	Read	U16	Integer	0-3	See following table	Bool
							4-11	Not Used	Bool
Input	4	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	5	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	6	Both	Alarms 1	Read	U16	Integer	0	High Rate	Bool
							1	Low Load Scale # 2	Bool
							2	Low Load Scale # 1	Bool
							3	Low Load	Bool
							4	High Load Scale # 2	Bool
							5	High Load Scale # 1	Bool

							6	High Load	Bool
							7	Speed Sensor Error	Bool
							8	ROM fail	Bool
							9	RAM fail	Bool
							10	Signal Cell Fail Scale # 4	Bool
							11	Signal Cell Fail Scale # 3	Bool
							12	Signal Cell Fail Scale # 2	Bool
							13	Signal Cell Fail Scale # 1	Bool
							14	Signal Cell Fail (Single Scale)	Bool
							15	Clock Fail	Bool
Input	7	Both	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
							1	Calibration Time Elapsed (Single Scale)	Bool
							2	Power During Calibration	Bool
							3	Cold Start	Bool
							4	Warm Start	Bool
							5	Low Speed Scale #2	Bool
							6	Low Speed Scale #1	Bool
							7	Low Speed	Bool
							8	High Speed Scale # 2	Bool
							9	High Speed Scale # 1	Bool
							10	High Speed	Bool
							11	Low Rate Scale # 2	Bool
							12	Low Rate Scale # 1	Bool
							13	Low Rate	Bool
							14	High Rate Scale # 2	Bool
							15	High Rate Scale # 1	Bool
Input	8	Both	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
							1	HW configuration Changed Slot 2	Bool
							2	HW configuration Changed Slot 1	Bool
							3	Batch Deviation Scale #2	Bool
							4	Batch Deviation Scale #1	Bool

							5	Batch Deviation	Bool
							6	AZT Over Limit Scale #2	Bool
							7	AZT Over Limit Scale #1	Bool
							8	AZT OVER LIMIT	Bool
							9	Overflow Totalizer Scale #2	Bool
							10	Overflow Totalizer Scale #1	Bool
							11	Overflow Totalizer	Bool
							12	External Alarm 3	Bool
							13	External Alarm 2	Bool
							14	External Alarm 1	Bool
							15	Calibration Time Elapsed Scale # 2	Bool
Input	9	Both	Alarms 4	Read	U16	Integer	0	Multiple load cell imbalance alarm	Bool
							1	AZT Over Limit Step Scale #2	Bool
							2	AZT Over Limit Step Scale #1	Bool
							3	AZT Over Limit Step	Bool
							4	Zero Limit Scale #2	Bool
							5	Zero Limit Scale #1	Bool
							6	Zero Limit	Bool
							7	ProfiBus Error	Bool
							8	Communication RIO Error	Bool
							9	Communication Error	Bool
							10	Printer Error	Bool
							11	Math Error	Bool
							12	BCD Error	Bool
							13	Not Used	Bool
							14	Audit Trail Wrapped	Bool
							15	HW configuration Changed Slot 4	Bool
Input	10	Both	Alarms 5	Read	U16	Integer	0-10	Not Used	Bool
							11	A/D Shutdown Channel 4	Bool
							12	A/D Shutdown Channel 3	Bool
							13	A/D Shutdown Channel 2	Bool

							14	A/D Shutdown Channel 1	Bool
							15	A/D Shutdown	Bool
Input	11	Both	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
Input	12	Both	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
							1	Input 2 - Digital 8In/8Out Board #1	Bool
							2	Input 3 - Digital 8In/8Out Board #1	Bool
							3	Input 4 - Digital 8In/8Out Board #1	Bool
							4	Input 5 - Digital 8In/8Out Board #1	Bool
							5	Input 6 - Digital 8In/8Out Board #1	Bool
							6	Input 7 - Digital 8In/8Out Board #1	Bool
							7	Input 8 - Digital 8In/8Out Board #1	Bool
							8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
							9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
							10	Input 3 - Digital Input Board	Bool
							11	Input 4 - Digital Input Board	Bool
							12	Input 5 - Digital Input Board	Bool
							13-15	Not Used	Bool
Input	13	Both	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
							2	Output 1 - Digital Input Board	Bool
							3	Output 2 - Digital Input Board	Bool
							4	Output 3 - Digital Input Board	Bool
							5	Output 4 - Digital Input Board	Bool
							6-7	Not Used	Bool
							8	Input 1 - Digital 8In/8Out Board #2	Bool
							9	Input 2 - Digital 8In/8Out Board #2	Bool
							10	Input 3 - Digital 8In/8Out Board #2	Bool
							11	Input 4 - Digital 8In/8Out Board #2	Bool
							12	Input 5 - Digital 8In/8Out Board #2	Bool
							13	Input 6 - Digital 8In/8Out Board #2	Bool
							14	Input 7 - Digital 8In/8Out Board #2	Bool

							15	Input 8 - Digital 8In/8Out Board #2	Bool
Input	14	Both	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
							1	Output 2 - Digital 8In/8Out Board #2	Bool
							2	Output 3 - Digital 8In/8Out Board #2	Bool
							3	Output 4 - Digital 8In/8Out Board #2	Bool
							4	Output 5 - Digital 8In/8Out Board #2	Bool
							5	Output 6 - Digital 8In/8Out Board #2	Bool
							6	Output 7 - Digital 8In/8Out Board #2	Bool
							7	Output 8 - Digital 8In/8Out Board #2	Bool
							8	Output 1 - Digital 8In/8Out Board #1	Bool
							9	Output 2 - Digital 8In/8Out Board #1	Bool
							10	Output 3 - Digital 8In/8Out Board #1	Bool
							11	Output 4 - Digital 8In/8Out Board #1	Bool
							12	Output 5 - Digital 8In/8Out Board #1	Bool
							13	Output 6 - Digital 8In/8Out Board #1	Bool
							14	Output 7 - Digital 8In/8Out Board #1	Bool
							15	Output 8 - Digital 8In/8Out Board #1	Bool
Input	15	Both	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
Input	16	Both	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
Input	17	Both	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
Input	18	Both	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
Input	19	Both	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
Input	20	Both	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
Input	21	Both	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
Input	22	Both	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
Input	23	Both	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
Input	24	Both	Number Of Trials	Read	U16	Integer			
Input	25	Both	Model ID	Read	U16	Integer			
Input	26	1	Batch Number	Read	U16	Integer			
Input	27	1	Batch Deviation	Read	U16	Integer			

Input	28	1	AZ Deviation	Read	U32	Long Integer		
Input	30	1	Zero Number	Read	U32	Long Integer		
Input	32	1	Zero Reference	Read	U32	Long Integer		
Input	34	1	Free Space	Read	U16	Integer		
Input	35	1	Free Space	Read	U16	Integer		
Input	36	1	Free Space	Read	U16	Integer		
Input	37	1	Free Space	Read	U16	Integer		
Input	38	1	Free Space	Read	U16	Integer		
Input	39	1	Free Space	Read	U16	Integer		
Input	40	1	Free Space	Read	U16	Integer		
Input	41	1	Free Space	Read	U16	Integer		
Input	42	1	Free Space	Read	U16	Integer		
Input	43	1	Free Space	Read	U16	Integer		
Input	44	1	Span Number	Read	IEEE754 Big-endian	Float		
Input	46	1	Scale Capacity	Read	IEEE754 Big-endian	Float		
Input	48	1	Speed Capacity	Read	IEEE754 Big-endian	Float		
Input	50	1	Load Cell Capacity	Read	IEEE754 Big-endian	Float		
Input	52	1	Rate	Read	IEEE754 Big-endian	Float		
Input	54	1	Load	Read	IEEE754 Big-endian	Float		
Input	56	1	Speed	Read	IEEE754 Big-endian	Float		
Input	58	1	Master Total	Read	IEEE754 Big-endian	Float		
Input	60	1	Reset Total	Read	IEEE754 Big-endian	Float		

Input	62	1	Operator Total	Read	IEEE754 Big-endian	Float			
Input	64	1	Batch Total	Read	IEEE754 Big-endian	Float			
Input	66	1	Batch Setpoint	Read	IEEE754 Big-endian	Float			
Input	68	1	Batch Preset	Read	IEEE754 Big-endian	Float			
Input	70	1	Batch Preact	Read	IEEE754 Big-endian	Float			
Input	72	1	AZT Correction	Read	IEEE754 Big-endian	Float			
Input	74	1	Auto Zero Max Dev	Read	IEEE754 Big-endian	Float			
Input	76	1	Total AZ %	Read	IEEE754 Big-endian	Float			
Input	78	1	AZT step limit	Read	IEEE754 Big-endian	Float			
Input	80	BOTH	Belt Warm	Read	IEEE754 Big-endian	Float			
Input	82	1	High Rate Set	Read	IEEE754 Big-endian	Float			
Input	84	1	Low Rate Set	Read	IEEE754 Big-endian	Float			
Input	86	1	High Speed Set	Read	IEEE754 Big-endian	Float			
Input	88	1	Low Speed Set	Read	IEEE754 Big-endian	Float			
Input	90	1	High Load Set	Read	IEEE754 Big-endian	Float			
Input	92	1	Low Load Set	Read	IEEE754 Big-endian	Float			
Input	94	1	Cal Error	Read	IEEE754 Big-endian	Float			
Input	96	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	98	1	Free Space	Read	IEEE754 Big-endian	Float			

Input	100	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	102	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	104	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	106	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	108	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	110	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	112	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	114	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	116	2	Status 1	Read	U16	Integer	0-1	Not Used	Bool
							2	Flag Low Speed	Bool
							3	Flag High Speed	Bool
							4	Flag Low Rate	Bool
							5	Flag High Rate	Bool
							6	Flag Low Load	Bool
							7	Flag High Load	Bool
							8-12	Not Used	Bool
							13	Calibration Running	Bool
							14	Cumulative Alarms Active	Bool
							15	Cumulative Shut Down Active	Bool
Input	117	2	Status 2	Read	U16	Integer	0-3	See following table	Bool
							4-11	Not Used	Bool
Input	118	2	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	119	2	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	120	2	Batch Number	Read	U16	Integer			
Input	121	2	Batch Deviation	Read	U16	Integer			

Input	122	2	AZ Deviation	Read	U32	Long Integer			
Input	124	2	Zero Number	Read	U32	Long Integer			
Input	126	2	Zero Reference	Read	U32	Long Integer			
Input	128	2	Free Space	Read	U16	Integer			
Input	129	2	Free Space	Read	U16	Integer			
Input	130	2	Free Space	Read	U16	Integer			
Input	131	2	Free Space	Read	U16	Integer			
Input	132	2	Free Space	Read	U16	Integer			
Input	133	2	Free Space	Read	U16	Integer			
Input	134	2	Free Space	Read	U16	Integer			
Input	135	2	Free Space	Read	U16	Integer			
Input	136	2	Free Space	Read	U16	Integer			
Input	137	2	Free Space	Read	U16	Integer			
Input	138	2	Span Number	Read	IEEE754 Big-endian	Float			
Input	140	2	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	142	2	Speed Capacity	Read	IEEE754 Big-endian	Float			
Input	144	2	Load Cell Capacity	Read	IEEE754 Big-endian	Float			
Input	146	2	Rate	Read	IEEE754 Big-endian	Float			
Input	148	2	Load	Read	IEEE754 Big-endian	Float			
Input	150	2	Speed	Read	IEEE754 Big-endian	Float			
Input	152	2	Master Total	Read	IEEE754 Big-endian	Float			
Input	154	2	Reset Total	Read	IEEE754 Big-endian	Float			

Input	156	2	Operator Total	Read	IEEE754 Big-endian	Float			
Input	158	2	Batch Total	Read	IEEE754 Big-endian	Float			
Input	160	2	Batch Setpoint	Read	IEEE754 Big-endian	Float			
Input	162	2	Batch Preset	Read	IEEE754 Big-endian	Float			
Input	164	2	Batch Preact	Read	IEEE754 Big-endian	Float			
Input	166	2	AZT Correction	Read	IEEE754 Big-endian	Float			
Input	168	2	Auto Zero Max Dev	Read	IEEE754 Big-endian	Float			
Input	170	2	Total AZ %	Read	IEEE754 Big-endian	Float			
Input	172	2	AZT step limit	Read	IEEE754 Big-endian	Float			
Input	174	2	High Rate Set	Read	IEEE754 Big-endian	Float			
Input	176	2	Low Rate Set	Read	IEEE754 Big-endian	Float			
Input	178	2	High Speed Set	Read	IEEE754 Big-endian	Float			
Input	180	2	Low Speed Set	Read	IEEE754 Big-endian	Float			
Input	182	2	High Load Set	Read	IEEE754 Big-endian	Float			
Input	184	2	Low Load Set	Read	IEEE754 Big-endian	Float			
Input	186	2	Cal Error	Read	IEEE754 Big-endian	Float			
Input	188	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	190	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	192	2	Free Space	Read	IEEE754 Big-endian	Float			

Input	194	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	196	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	198	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	200	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	202	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	204	2	Free Space	Read	IEEE754 Big-endian	Float			
Input	206	2	Free Space	Read	IEEE754 Big-endian	Float			

Table 7 – Ethernet/IP 9101 Input Table

Register Status 2 (Offset 2) Bit 0-3 Lookup Table				
Description	Bit Position			
	3	2	1	0
Batch Not Running	0	0	0	0
Batch is going To Start	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 8 – Register Status 2 (Offset 2) Bit 0-3 Lookup Table

Output Data Table – The Output data table contains information that is written from the PLC to the 9105.

Instance	Offset	Scale	Description	Access	Format	Type	Bit Position	Description	Type
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Output	0	Both	Number Of trials	Write	U16	Integer			
Output	1	1	Free Space	Write	U16	Integer			
Output	2	1	Command	Write	U32	Long Integer	0-15	Not Used	Bool
							0	Acknowledge Alarms	Bool
							1	Batch Start	Bool
							2	Batch Abort	Bool
							3	Batch Standby	Bool
							4	Remote Acquire new Zero or Span	Bool
							5	Remote start zero	Bool
							6	Remote start weights calibration	Bool
							7	Remote start chain calibration	Bool
							8	Remote start R-Cal	Bool
							9	Reset short-term total	Bool
							10	Reset operator total	Bool
							11-15	Unused	Bool
Output	4	Both	Last Key Pressed	Write	U16	Integer			
Output	5	1	Batch Number	Write	U16	Integer			
Output	6	1	Batch Deviation	Write	U16	Integer			
Output	7	1	Free Space	Write	U16	Integer			
Output	8	1	Free Space	Write	U16	Integer			
Output	9	1	Free Space	Write	U16	Integer			
Output	10	1	Free Space	Write	U16	Integer			
Output	11	1	Free Space	Write	U16	Integer			
Output	12	1	Free Space	Write	U16	Integer			
Output	13	1	Free Space	Write	U16	Integer			
Output	14	1	Free Space	Write	U16	Integer			
Output	15	1	Free Space	Write	U16	Integer			
Output	16	1	Free Space	Write	U16	Integer			
Output	17	1	Free Space	Write	U16	Integer			

Output	18	1	Scale Capacity	Write	IEEE754 Big-endian	Float			
Output	20	1	Speed Capacity	Write	IEEE754 Big-endian	Float			
Output	22	1	Load Cell Capacity	Write	IEEE754 Big-endian	Float			
Output	24	1	Batch Setpoint	Write	IEEE754 Big-endian	Float			
Output	26	1	Batch Preset	Write	IEEE754 Big-endian	Float			
Output	27	1	Batch Preact	Write	IEEE754 Big-endian	Float			
Output	30	1	Auto Zero Max Dev	Write	IEEE754 Big-endian	Float			
Output	32	1	AZT step limit	Write	IEEE754 Big-endian	Float			
Output	34	Both	Belt Warm	Write	IEEE754 Big-endian	Float			
Output	36	1	High Rate Set	Write	IEEE754 Big-endian	Float			
Output	38	1	Low Rate Set	Write	IEEE754 Big-endian	Float			
Output	40	1	High Speed Set	Write	IEEE754 Big-endian	Float			
Output	42	1	Low Speed Set	Write	IEEE754 Big-endian	Float			
Output	44	1	High Load Set	Write	IEEE754 Big-endian	Float			
Output	46	1	Low Load Set	Write	IEEE754 Big-endian	Float			
Output	47	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	50	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	52	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	54	1	Free Space	Write	IEEE754 Big-endian	Float			

Output	56	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	58	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	60	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	62	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	64	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	66	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	68	2	Command	Write	U32	Long Integer	0-15	Not Used	Bool
							0	Acknowledge Alarms	Bool
							1	Batch Start	Bool
							2	Batch Abort	Bool
							3	Batch Standby	Bool
							4	Remote Acquire new Zero or Span	Bool
							5	Remote start zero	Bool
							6	Remote start weights calibration	Bool
							7	Remote start chain calibration	Bool
							8	Remote start R-Cal	Bool
							9	Reset short-term total	Bool
							10	Reset operator total	Bool
11-15	Unused	Bool							
Output	70	2	Batch Number	Write	U16	Integer			
Output	71	2	Batch Deviation	Write	U16	Integer			
Output	72	2	Free Space	Write	U16	Integer			
Output	73	2	Free Space	Write	U16	Integer			
Output	74	2	Free Space	Write	U16	Integer			
Output	75	2	Free Space	Write	U16	Integer			
Output	76	2	Free Space	Write	U16	Integer			

Output	77	2	Free Space	Write	U16	Integer		
Output	78	2	Free Space	Write	U16	Integer		
Output	79	2	Free Space	Write	U16	Integer		
Output	80	2	Free Space	Write	U16	Integer		
Output	81	2	Free Space	Write	U16	Integer		
Output	82	2	Scale Capacity	Write	IEEE754 Big-endian	Float		
Output	84	2	Speed Capacity	Write	IEEE754 Big-endian	Float		
Output	86	2	Load Cell Capacity	Write	IEEE754 Big-endian	Float		
Output	88	2	Batch Setpoint	Write	IEEE754 Big-endian	Float		
Output	90	2	Batch Preset	Write	IEEE754 Big-endian	Float		
Output	92	2	Batch Preact	Write	IEEE754 Big-endian	Float		
Output	94	2	Auto Zero Max Dev	Write	IEEE754 Big-endian	Float		
Output	96	2	AZT step limit	Write	IEEE754 Big-endian	Float		
Output	98	2	High Rate Set	Write	IEEE754 Big-endian	Float		
Output	100	2	Low Rate Set	Write	IEEE754 Big-endian	Float		
Output	102	2	High Speed Set	Write	IEEE754 Big-endian	Float		
Output	104	2	Low Speed Set	Write	IEEE754 Big-endian	Float		
Output	106	2	High Load Set	Write	IEEE754 Big-endian	Float		
Output	108	2	Low Load Set	Write	IEEE754 Big-endian	Float		
Output	110	2	Free Space	Write	IEEE754 Big-endian	Float		
Output	112	2	Free Space	Write	IEEE754 Big-endian	Float		

Output	114	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	116	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	118	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	120	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	122	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	124	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	126	2	Free Space	Write	IEEE754 Big-endian	Float			
Output	128	2	Free Space	Write	IEEE754 Big-endian	Float			

Table 9 – Ethernet/IP 9101 Output Table



Micro-Tech 9101 Modbus TCP Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9101 are as follows.

- **REC4281** 9101 9201 Integrator Reference Manual – All languages and all revisions.
- **REC4282** 9101 9201 Integrator User Manual – All languages and all revisions.

Software Version Information

This version of the Modbus Register has only been tested with the most recent 9101 software version **140.00.04.10**

These Modbus TCP registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 140.00.04.10 is available as a software update, please contact your Ramsey distributor.

Modbus TCP Setup Information

The Modbus TCP Ethernet connection is established over port 502 and does not require a Slave ID to function. Modbus TCP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Modbus TCP Data Read

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

The Micro-Tech 9101 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9101 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9101 will return an error or provide incorrect data.

**Modbus TCP
Data Write**

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9101. This may also cause the 9105 to become non-responsive and require a reboot.

Modbus Register	Scale	Description	Access	Format	Type	Bit Position	Description	Type
40001	Both	Success Flag	Read	U16	Integer			
40002-40011	Both	Display Line 1 – Total of 20 Characters over the first display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40012-40021	Both	Display Line 2 - Total of 20 Characters over the second display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40022-40031	Both	Display Line 3 - Total of 20 Characters over the third display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40032-40041	Both	Display Line 4 - Total of 20 Characters over the fourth display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40042-40081	Both	Display Line 5 - Total of 80 Characters over the fifth display line,	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40082	Both	Status LED	Read	U16	Integer	0 1 2 3 4 5-15	Ready LED 1 (Green Solid) Batch LED 2 (Green) Alarm LED 3 (Red Flash) Zero or Span Calibration LED 4 (Red Solid) Zero w LED 1 (Green Solid) Not Used	Bool Bool Bool Bool Bool Bool
40083	1	Status 1	Read	U16	Integer	0-1 2 3	Not Used Flag Low Speed Flag High Speed	Bool Bool Bool

						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
40084	1	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-15	Not Used	Bool
40085	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40086	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40087	Both	Alarms 1	Read	U16	Integer	0	High Rate	Bool
						1	Low Load Scale # 2	Bool
						2	Low Load Scale # 1	Bool
						3	Low Load	Bool
						4	High Load Scale # 2	Bool
						5	High Load Scale # 1	Bool
						6	High Load	Bool
						7	Speed Sensor Error	Bool
						8	ROM fail	Bool
						9	RAM fail	Bool
						10	Signal Cell Fail Scale # 4	Bool
						11	Signal Cell Fail Scale # 3	Bool
						12	Signal Cell Fail Scale # 2	Bool
						13	Signal Cell Fail Scale # 1	Bool
						14	Signal Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
40088	Both	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool

						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool
						14	High Rate Scale # 2	Bool
						15	High Rate Scale # 1	Bool
40089	Both	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool
						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool
						8	AZT OVER LIMIT	Bool
						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool
						12	External Alarm 3	Bool
						13	External Alarm 2	Bool
						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
40090	Both	Alarms 4	Read	U16	Integer	0	Multiple load cell imbalance alarm	Bool
						1	AZT Over Limit Step Scale #2	Bool

						2	AZT Over Limit Step Scale #1	Bool
						3	AZT Over Limit Step	Bool
						4	Zero Limit Scale #2	Bool
						5	Zero Limit Scale #1	Bool
						6	Zero Limit	Bool
						7	ProfiBus Error	Bool
						8	Communication RIO Error	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12	BCD Error	Bool
						13	Not Used	Bool
						14	Audit Trail Wrapped	Bool
						15	HW configuration Changed Slot 4	Bool
40091	Both	Alarms 5	Read	U16	Integer	0-10	Not Used	Bool
						11	A/D Shutdown Channel 4	Bool
						12	A/D Shutdown Channel 3	Bool
						13	A/D Shutdown Channel 2	Bool
						14	A/D Shutdown Channel 1	Bool
						15	A/D Shutdown	Bool
40092	Both	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
40093	Both	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool

						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
40094	Both	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
40095	Both	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool

						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
40096	Both	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
40097	Both	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
40098	Both	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
40099	Both	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
40100	Both	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
40101	Both	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
40102	Both	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
40103	Both	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
40104	Both	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
40105	Both	Number Of trials	Read/Write	U16	Integer			
40106	1	Command	Read/Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
						10	Reset operator total	Bool
11-15	Unused	Bool						
40108	Both	Last Key Pressed	Read/Write	U16	Integer			

40109	Both	Model ID	Read	U16	Integer			
40110	1	Batch Number	Read/Write	U16	Integer			
40111	1	Batch Deviation	Read/Write	U16	Integer			
40112	1	AZ Deviation	Read	U32	Long Integer			
40114	1	Zero Number	Read	U32	Long Integer			
40116	1	Zero Reference	Read	U32	Long Integer			
40118	1	Free Space	Read	U16	Integer			
40119	1	Free Space	Read	U16	Integer			
40120	1	Free Space	Read	U16	Integer			
40121	1	Free Space	Read	U16	Integer			
40122	1	Free Space	Read	U16	Integer			
40123	1	Free Space	Read	U16	Integer			
40124	1	Free Space	Read	U16	Integer			
40125	1	Free Space	Read	U16	Integer			
40126	1	Free Space	Read	U16	Integer			
40127	1	Free Space	Read	U16	Integer			
40128	1	Span Number	Read	IEEE754 Big-endian	Float			
40130	1	Scale Capacity	Read/Write	IEEE754 Big-endian	Float			
40132	1	Speed Capacity	Read	IEEE754 Big-endian	Float			
40134	1	Load Cell Capacity	Read/Write	IEEE754 Big-endian	Float			
40136	1	Rate	Read	IEEE754 Big-endian	Float			
40138	1	Load	Read	IEEE754 Big-endian	Float			
40140	1	Speed	Read	IEEE754 Big-endian	Float			

40142	1	Master Total	Read	IEEE754 Big-endian	Float			
40144	1	Reset Total	Read/ Write	IEEE754 Big-endian	Float			
40146	1	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40148	1	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40150	1	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40152	1	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40154	1	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40156	1	AZT Correction	Read	IEEE754 Big-endian	Float			
40158	1	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40160	1	Total AZ %	Read	IEEE754 Big-endian	Float			
40162	1	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40164	1	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40166	1	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40168	1	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40170	1	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40172	1	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40174	1	High Load Set	Read/ Write	IEEE754 Big-endian	Float			
40176	1	Low Load Set	Read/ Write	IEEE754 Big-endian	Float			
40178	1	Cal Error	Read	IEEE754 Big-endian	Float			

40180	1	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40184	1	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40188	1	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40192	1	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40196	1	Free Space	Read	IEEE754 Big-endian	Float			
40198	1	Free Space	Read	IEEE754 Big-endian	Float			
40200	1	Free Space	Read	IEEE754 Big-endian	Float			
40202	1	Free Space	Read	IEEE754 Big-endian	Float			
40204	1	Free Space	Read	IEEE754 Big-endian	Float			
40206	1	Free Space	Read	IEEE754 Big-endian	Float			
40208	1	Free Space	Read	IEEE754 Big-endian	Float			
40210	1	Free Space	Read	IEEE754 Big-endian	Float			
40212	1	Free Space	Read	IEEE754 Big-endian	Float			
40214	1	Free Space	Read	IEEE754 Big-endian	Float			
40216	2	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool
						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool

						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
40217	2	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-11	Not Used	Bool
						12	High-High Negative Deviation	Bool
						13	High Negative Deviation	Bool
						14	High-High Positive Deviation	Bool
						15	High Positive Deviation	Bool
40218	2	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40219	2	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40220	2	Command	Read/ Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
						10	Reset operator total	Bool
						11-15	Unused	Bool
40222	2	Batch Number	Read/ Write	U16	Integer			
40223	2	Batch Deviation	Read/ Write	U16	Integer			
40224	2	AZ Deviation	Read	U32	Long Integer			
40226	2	Zero Number	Read	U32	Long Integer			

40228	2	Zero Reference	Read	U32	Long Integer			
40230	2	Free Space	Read	U16	Integer			
40231	2	Free Space	Read	U16	Integer			
40232	2	Free Space	Read	U16	Integer			
40233	2	Free Space	Read	U16	Integer			
40234	2	Free Space	Read	U16	Integer			
40235	2	Free Space	Read	U16	Integer			
40236	2	Free Space	Read	U16	Integer			
40237	2	Free Space	Read	U16	Integer			
40238	2	Free Space	Read	U16	Integer			
40239	2	Free Space	Read	U16	Integer			
40240	2	Span Number	Read	IEEE754 Big-endian	Float			
40242	2	Scale Capacity	Read/Write	IEEE754 Big-endian	Float			
40244	2	Speed Capacity	Read	IEEE754 Big-endian	Float			
40246	2	Load Cell Capacity	Read/Write	IEEE754 Big-endian	Float			
40248	2	Rate	Read	IEEE754 Big-endian	Float			
40250	2	Load	Read	IEEE754 Big-endian	Float			
40252	2	Speed	Read	IEEE754 Big-endian	Float			
40254	2	Master Total	Read	IEEE754 Big-endian	Float			
40256	2	Reset Total	Read/Write	IEEE754 Big-endian	Float			
40258	2	Operator Total	Read/Write	IEEE754 Big-endian	Float			
40260	2	Batch Total	Read/Write	IEEE754 Big-endian	Float			

40262	2	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40264	2	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40266	2	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40268	2	AZT Correction	Read	IEEE754 Big-endian	Float			
40270	2	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40272	2	Total AZ %	Read	IEEE754 Big-endian	Float			
40274	2	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40276	2	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40278	2	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40280	2	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40282	2	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40284	2	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40286	2	High Load Set	Read/ Write	IEEE754 Big-endian	Float			
40288	2	Low Load Set	Read/ Write	IEEE754 Big-endian	Float			
40290	2	Cal Error	Read	IEEE754 Big-endian	Float			
40292	2	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40296	2	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40300	2	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40304	2	Batch Total Double	Read	IEEE754 Big-endian	Long Float			

40308	2	Free Space	Read	IEEE754 Big-endian	Float			
40310	2	Free Space	Read	IEEE754 Big-endian	Float			
40312	2	Free Space	Read	IEEE754 Big-endian	Float			
40314	2	Free Space	Read	IEEE754 Big-endian	Float			
40316	2	Free Space	Read	IEEE754 Big-endian	Float			
40318	2	Free Space	Read	IEEE754 Big-endian	Float			
40320	2	Free Space	Read	IEEE754 Big-endian	Float			
40322	2	Free Space	Read	IEEE754 Big-endian	Float			
40324	2	Free Space	Read	IEEE754 Big-endian	Float			
40326	2	Free Space	Read	IEEE754 Big-endian	Float			

Table 10 – Modbus TCP Register Table

Register 40084 Bit 0-3 Lookup Table	Bit Position			
Description	3	2	1	0
Batch Not Running	0	0	0	0
Not Used	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 11 – Modbus Register Bit 0-3 Lookup Table



Micro-Tech 9101 Modbus RTU Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9101 are as follows.

- **REC4281** 9101 9201 Integrator Reference Manual – All languages and all revisions.
- **REC4282** 9101 9201 Integrator User Manual – All languages and all revisions.

Software Version Information

This version of the Modbus Register has only been tested with the most recent 9101 software version **140.00.04.10**

These Modbus RTU registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 140.00.04.10 is available as a software update, please contact your Ramsey distributor.

Modbus RTU HMI Setup Information

The Modbus RTU connection is established over serial RS485 4 wire. Modbus RTU does not need to be turned on in the Micro-Tech controller, just connect the serial cable and set the information below.

To enter the Serial information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 5” appears in the LCD display.
- Press the softkey button under the **CommA** text on the screen to enter the Serial setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - Baud Rate = XXXX (9600 default, user defined).
 - Parity = XX (No Parity default, user defined).
 - Stop Bits = XX (1 default, user defined).
 - Word Length = XX (8 default, user defined).
 - Protocol = Modbus
 - Address = XX (1 default, user defined).

Modbus RTU Hardware Setup Information

NOTE – RS485 Full Duplex (4 wire) protocol has been successfully verified and tested by Ramsey. RS485 Half Duplex (2 wire) has been tested by Ramsey and does not work reliably on the 9101.

From the factory, the default jumper position is set for RS232, which was used to connect a printer. For Modbus RTU communications, the jumpers need to be set for RS485 Full Duplex (4 wire) as per the following table.

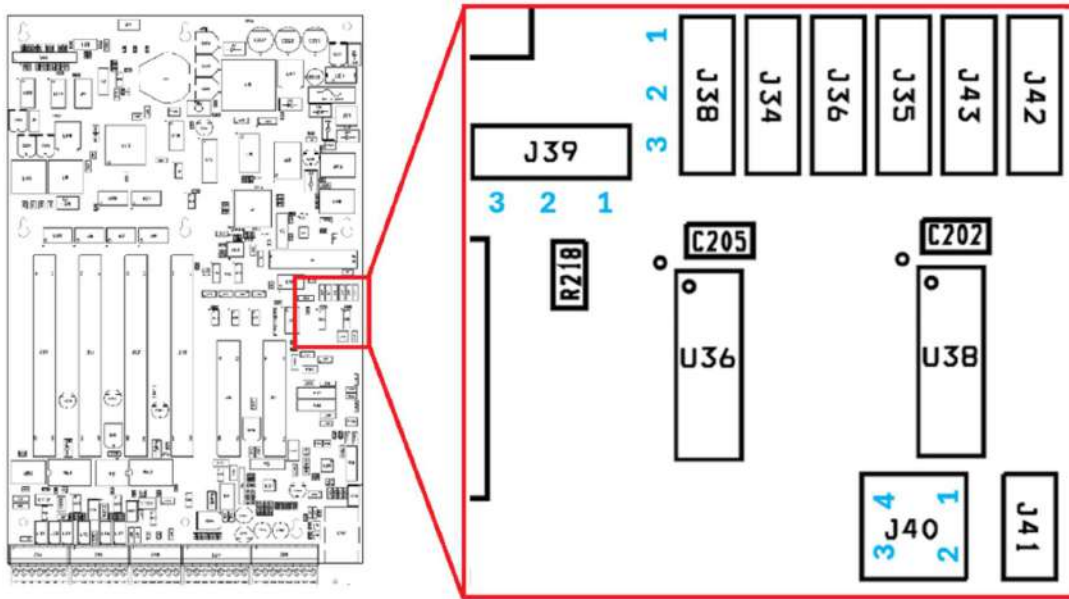


Figure 2 – RS485 4 Wire Jumper Positions

Jumper	J39	J38	J34	J36	J35	J43	J43	J40
RS485 4 Wire – No Termination Resistors	2-3	1-2	1-2	2-3	2-3	1-2	1-2	3-4
RS485 4 Wire – With 120ohm Termination Resistor	2-3	1-2	1-2	2-3	2-3	1-2	1-2	1-2
RS485 4 Wire – With 120ohm Termination Resistor and 600ohm Pull up / Pull Down Bias Resistors	2-3	1-2	1-2	2-3	2-3	2-3	2-3	1-2

Table 12 – RS485 4 Wire Jumper Positions

**Modbus RTU
Data Read**

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

Note that the display read out of the 5th line is not available with Modbus RTU – only with Modbus TCP. Only lines 1, 2, 3 and 4 are transferred over Modbus RTU.

The Micro-Tech 9101 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9101 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9105 will return an error or provide incorrect data.

Modbus RTU Data Write

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9101. This may also cause the 9105 to become non-responsive and require a reboot.

Modbus Register	Scale	Description	Access	Format	Type	Bit Position	Description	Type
40001	Both	Success Flag	Read	U16	Integer			
40002-40021	Both	Display Line 1 – Total of 20 Characters over the first display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40022-40041	Both	Display Line 2 - Total of 20 Characters over the second display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40042-40061	Both	Display Line 3 - Total of 20 Characters over the third display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40062-40081	Both	Display Line 4 - Total of 20 Characters over the fourth display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40082	Both	Status LED	Read	U16	Integer	0 1 2	Ready LED 1 (Green Solid) Batch LED 2 (Green) Alarm LED 3 (Red Flash)	Bool Bool Bool

						3	Zero or Span Calibration LED 4 (Red Solid)	Bool
						4	Zero w LED 1 (Green Solid)	Bool
						5-15	Not Used	Bool
40083	1	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool
						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
40084	1	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-15	Not Used	Bool
40085	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40086	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40087	Both	Alarms 1	Read	U16	Integer	0	High Rate	Bool
						1	Low Load Scale # 2	Bool
						2	Low Load Scale # 1	Bool
						3	Low Load	Bool
						4	High Load Scale # 2	Bool
						5	High Load Scale # 1	Bool
						6	High Load	Bool
						7	Speed Sensor Error	Bool
						8	ROM fail	Bool
						9	RAM fail	Bool
						10	Signal Cell Fail Scale # 4	Bool
						11	Signal Cell Fail Scale # 3	Bool
						12	Signal Cell Fail Scale # 2	Bool

						13	Signal Cell Fail Scale # 1	Bool
						14	Signal Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
40088	Both	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool
						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool
						14	High Rate Scale # 2	Bool
15	High Rate Scale # 1	Bool						
40089	Both	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool
						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool
						8	AZT OVER LIMIT	Bool
						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool

						12	External Alarm 3	Bool
						13	External Alarm 2	Bool
						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
40090	Both	Alarms 4	Read	U16	Integer	0	Multiple load cell imbalance alarm	Bool
						1	AZT Over Limit Step Scale #2	Bool
						2	AZT Over Limit Step Scale #1	Bool
						3	AZT Over Limit Step	Bool
						4	Zero Limit Scale #2	Bool
						5	Zero Limit Scale #1	Bool
						6	Zero Limit	Bool
						7	ProfiBus Error	Bool
						8	Communication RIO Error	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12	BCD Error	Bool
						13	Not Used	Bool
						14	Audit Trail Wrapped	Bool
15	HW configuration Changed Slot 4	Bool						
40091	Both	Alarms 5	Read	U16	Integer	0-10	Not Used	Bool
						11	A/D Shutdown Channel 4	Bool
						12	A/D Shutdown Channel 3	Bool
						13	A/D Shutdown Channel 2	Bool
						14	A/D Shutdown Channel 1	Bool
						15	A/D Shutdown	Bool
40092	Both	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
40093	Both	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool

						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
40094	Both	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
40095	Both	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool

						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool
						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
40096	Both	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
40097	Both	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
40098	Both	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
40099	Both	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
40100	Both	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
40101	Both	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
40102	Both	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
40103	Both	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
40104	Both	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
40105	Both	Number Of trials	Read/Write	U16	Integer			
40106	1	Command	Read/Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
8	Remote start R-Cal	Bool						

						9 10 11-15	Reset short-term total Reset operator total Unused	Bool Bool Bool
40108	Both	Last Key Pressed	Read/ Write	U16	Integer			
40109	Both	Model ID	Read	U16	Integer			
40110	1	Batch Number	Read/ Write	U16	Integer			
40111	1	Batch Deviation	Read/ Write	U16	Integer			
40112	1	AZ Deviation	Read	U32	Long Integer			
40114	1	Zero Number	Read	U32	Long Integer			
40116	1	Zero Reference	Read	U32	Long Integer			
40118	1	Free Space	Read	U16	Integer			
40119	1	Free Space	Read	U16	Integer			
40120	1	Free Space	Read	U16	Integer			
40121	1	Free Space	Read	U16	Integer			
40122	1	Free Space	Read	U16	Integer			
40123	1	Free Space	Read	U16	Integer			
40124	1	Free Space	Read	U16	Integer			
40125	1	Free Space	Read	U16	Integer			
40126	1	Free Space	Read	U16	Integer			
40127	1	Free Space	Read	U16	Integer			
40128	1	Span Number	Read	IEEE754 Big-endian	Float			
40130	1	Scale Capacity	Read/ Write	IEEE754 Big-endian	Float			
40132	1	Speed Capacity	Read	IEEE754 Big-endian	Float			
40134	1	Load Cell Capacity	Read/ Write	IEEE754 Big-endian	Float			

40136	1	Rate	Read	IEEE754 Big-endian	Float			
40138	1	Load	Read	IEEE754 Big-endian	Float			
40140	1	Speed	Read	IEEE754 Big-endian	Float			
40142	1	Master Total	Read	IEEE754 Big-endian	Float			
40144	1	Reset Total	Read/ Write	IEEE754 Big-endian	Float			
40146	1	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40148	1	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40150	1	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40152	1	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40154	1	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40156	1	AZT Correction	Read	IEEE754 Big-endian	Float			
40158	1	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40160	1	Total AZ %	Read	IEEE754 Big-endian	Float			
40162	1	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40164	1	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40166	1	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40168	1	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40170	1	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40172	1	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			

40174	1	High Load Set	Read/Write	IEEE754 Big-endian	Float			
40176	1	Low Load Set	Read/Write	IEEE754 Big-endian	Float			
40178	1	Cal Error	Read	IEEE754 Big-endian	Float			
40180	1	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40184	1	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40188	1	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40192	1	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40196	1	Free Space	Read	IEEE754 Big-endian	Float			
40198	1	Free Space	Read	IEEE754 Big-endian	Float			
40200	1	Free Space	Read	IEEE754 Big-endian	Float			
40202	1	Free Space	Read	IEEE754 Big-endian	Float			
40204	1	Free Space	Read	IEEE754 Big-endian	Float			
40206	1	Free Space	Read	IEEE754 Big-endian	Float			
40208	1	Free Space	Read	IEEE754 Big-endian	Float			
40210	1	Free Space	Read	IEEE754 Big-endian	Float			
40212	1	Free Space	Read	IEEE754 Big-endian	Float			
40214	1	Free Space	Read	IEEE754 Big-endian	Float			
40216	2	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool

						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
40217	2	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-11	Not Used	Bool
						12	High-High Negative Deviation	Bool
						13	High Negative Deviation	Bool
						14	High-High Positive Deviation	Bool
						15	High Positive Deviation	Bool
40218	2	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40219	2	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40220	2	Command	Read/ Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
						10	Reset operator total	Bool
						11-15	Unused	Bool

40222	2	Batch Number	Read/Write	U16	Integer			
40223	2	Batch Deviation	Read/Write	U16	Integer			
40224	2	AZ Deviation	Read	U32	Long Integer			
40226	2	Zero Number	Read	U32	Long Integer			
40228	2	Zero Reference	Read	U32	Long Integer			
40230	2	Free Space	Read	U16	Integer			
40231	2	Free Space	Read	U16	Integer			
40232	2	Free Space	Read	U16	Integer			
40233	2	Free Space	Read	U16	Integer			
40234	2	Free Space	Read	U16	Integer			
40235	2	Free Space	Read	U16	Integer			
40236	2	Free Space	Read	U16	Integer			
40237	2	Free Space	Read	U16	Integer			
40238	2	Free Space	Read	U16	Integer			
40239	2	Free Space	Read	U16	Integer			
40240	2	Span Number	Read	IEEE754 Big-endian	Float			
40242	2	Scale Capacity	Read/Write	IEEE754 Big-endian	Float			
40244	2	Speed Capacity	Read	IEEE754 Big-endian	Float			
40246	2	Load Cell Capacity	Read/Write	IEEE754 Big-endian	Float			
40248	2	Rate	Read	IEEE754 Big-endian	Float			
40250	2	Load	Read	IEEE754 Big-endian	Float			
40252	2	Speed	Read	IEEE754 Big-endian	Float			

40254	2	Master Total	Read	IEEE754 Big-endian	Float			
40256	2	Reset Total	Read/ Write	IEEE754 Big-endian	Float			
40258	2	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40260	2	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40262	2	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40264	2	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40266	2	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40268	2	AZT Correction	Read	IEEE754 Big-endian	Float			
40270	2	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40272	2	Total AZ %	Read	IEEE754 Big-endian	Float			
40274	2	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40276	2	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40278	2	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40280	2	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40282	2	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40284	2	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40286	2	High Load Set	Read/ Write	IEEE754 Big-endian	Float			
40288	2	Low Load Set	Read/ Write	IEEE754 Big-endian	Float			
40290	2	Cal Error	Read	IEEE754 Big-endian	Float			

40292	2	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40296	2	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40300	2	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40304	2	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40308	2	Free Space	Read	IEEE754 Big-endian	Float			
40310	2	Free Space	Read	IEEE754 Big-endian	Float			
40312	2	Free Space	Read	IEEE754 Big-endian	Float			
40314	2	Free Space	Read	IEEE754 Big-endian	Float			
40316	2	Free Space	Read	IEEE754 Big-endian	Float			
40318	2	Free Space	Read	IEEE754 Big-endian	Float			
40320	2	Free Space	Read	IEEE754 Big-endian	Float			
40322	2	Free Space	Read	IEEE754 Big-endian	Float			
40324	2	Free Space	Read	IEEE754 Big-endian	Float			
40326	2	Free Space	Read	IEEE754 Big-endian	Float			

Table 13 – Modbus RTU Register Table

Register 40084 Bit 0-3 Lookup Table	Bit Position			
	3	2	1	0
Description				
Batch Not Running	0	0	0	0
Not Used	0	0	0	1
Batch is Running at High Rate	0	0	1	0

Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 14 – Modbus Register Bit 0-3 Lookup Table



Micro-Tech 9101 ProfiBus Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9101 are as follows.

- **REC4281** 9101 9201 Integrator Reference Manual – All languages and all revisions.
- **REC4282** 9101 9201 Integrator User Manual – All languages and all revisions.
- **REC4372** 9000 ProfiBus-DP Protocol Manual – All languages and all revisions.

Software Version Information

This version of the ProfiBus Register has only been tested with the most recent 9101 software version as noted below.

- **140.00.04.10**

Functioning of ProfiBus has not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 140.00.04.10 is available as a software update, please contact your Ramsey distributor.

GSD Version Information

This version of the 9101 software must use the following General Station Description (GSD) file, it is the only version of the ProfiBus GSD file that has been tested with the 9101 software version 140.00.04.10.

- **GSD_9101_140_00_04_10.gsd**

This GSD file is available, please contact your Ramsey distributor. Updating the GSD file on the PLC may require modifications to the connected PLC program if using older software versions of the 9101.

NOTE - GSD files have a maximum character length of 12 when being loaded into Siemens TIA portal, so loading this file will result in an error. The file name will need to be shortened by the user prior to loading into TIA portal. Ramsey use a longer file name for version control and tracking purposes.

ProfiBus Setup Information

ProfiBus is not native to the standard 9101 and requires an additional option card to function (Part number 102936). If ProfiBus is required and your controller does not have this option card installed, then please contact your Ramsey distributor.

ProfiBus **does** need to be turned on in the Micro-Tech controller and the device ID set. To setup ProfiBus do the following.

- With 9101 powered down, install the ProfiBus card (Part number 102936) into any slot with the larger board connectors (Slots U1, U2, U3 or U4). The end DB9 extender will need to be removed to install the ProfiBus card into the slot – do not force it in or it may damage the option card or main PCB. The end DB9 connector will need to be reinstalled after option card installation so the Siemens style ProfiBus DB9 connector will reach the option card DB9 connector.
- Power on the unit. The screen will display “Slot X Changed – Acquire New Configuration?” to which you must press the **Yes** soft key. If you press No, or the screen times out, then the ProfiBus option card is not configured and will not

communicate. If either of these happened, then remove the option card, power up, power down then follow the above process again.

- Press the softkey **Menu** button until “Main Menu 5” appears in the LCD display.
- Press the softkey button under the **Profib** text on the screen to enter the ProfiBus setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - Address = XXX (User defined – must be between 0-126).
 - Read Buffer Dimension = 48 words (User defined – suggest to not modify, range of 5-48).
 - Write Buffer Dimension = 48 words (User defined – suggest to not modify, range of 5-48).
 - Variable Selection = Not Damped, Damped, Displayed.

ProfiBus Data Blocks

In the 9101 ProfiBus data is organized in Registers which are then contained inside Data Blocks. These Data Blocks are shown in the table below. Some Data Blocks are “Read only” (RO) while others are “Write Only” (WO). The Micro-Tech 9101 updates the internal registers every 100ms (approximately). Reads of the Data Block at faster rates than 100ms will receive the same data multiple times. The data sent from the 9101 to the Master is in format of MSB first then LSB second.

Block Type	Identification Number	Description of Data
Read	0	Status, Alarms, I/O, Dynamic data
	1	Batch (Load Out)
	2	Sets and Thresholds
Write	100	Status, Alarms, I/O, Dynamic data
	101	Batch (Load Out)
	102	Sets and Thresholds

Table 15 – ProfiBus Block Information

ProfiBus Read

In the ProfiBus protocol, the Master continuously reads data from the 9101 Read buffer. The 9101 starts to update the Read buffer with the Registers contained in Block 0 immediately from Power On, and will continue to do so until instructed to populate different information into the Read buffer.

To change data in the Read buffer from Block 0 to Block 1, 2 or 3 requires a Write message to be sent from the Master to the 9101.

ID	Offset	Description	Data Type	Bit Position	Description
1	1	Block Identifier	Integer	0	0 = Block 0 1 = Block 1

		This determines which Data Block gets copied into the Read buffer, and therefore determines what data is being read by the ProfiBus Master.			2 = Block 2 3 = Block 3
				1-7	Not Used
				8	0 = Scale 1 1 = Scale 2 2 = Scale 3 3 = Scale 4
				9-15	Not Used
2	2	1st Register From within the Data Block requested, what is the first Register that should be read. A value of 0 means the first register onwards will be placed in the Read buffer.	Integer		
3	3	Number of Registers From the first Register specified within the Data Block, how many Registers should be transferred into the Read Buffer. A value of 0 means the entire Data Block is placed into the Buffer.	Integer		
4	4	Stamp To avoid the 9105 interpreting the same Master message over and over again, the 9105 interprets received data only if the stamp value is different from the stamp value received in the previous request. The Master has only to change the stamp value when it creates a new message – in this case a request to change which Data Block to read. The stamp can be any number as long as its different between messages, so a random number or incremental counter value will suffice.	Integer		

Table 16 – Write data to Change Data Block Read

Read Data Block 0 - Block “0” is the Read block that contains all the registers relevant to the Status, Alarms, I/O and Dynamic data. It is the default group the Micro-Tech 9101 sends to the Master for a read request if the Master does not change the requested Data Block.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
0	5	Status LED	Read	U16	Integer	0	Ready LED 1 (Green Solid)	Bool
						1	Batch LED 2 (Green)	Bool
						2	Alarm LED 3 (Red Flash)	Bool
						3	Zero or Span Calibration LED 4 (Red Solid)	Bool
						4	Zero w LED 1 (Green Solid)	Bool

						5	Remote LED 4 (Green Solid)	Bool
						6	Auto LED 2 (Green Solid)	Bool
						7-15	Not Used	Bool
0	6	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool
						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
0	7	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-11	Not Used	Bool
						12	High-High Negative Deviation	Bool
						13	High Negative Deviation	Bool
						14	High-High Positive Deviation	Bool
						15	High Positive Deviation	Bool
0	8	Status 3	Read	U16	Integer	0-15	Not Used	Bool
0	9	Status 4	Read	U16	Integer	0-15	Not Used	Bool
0	10	Alarms 1	Read	U16	Integer	0	High Rate	Bool
						1	Low Load Scale # 2	Bool
						2	Low Load Scale # 1	Bool
						3	Low Load	Bool
						4	High Load Scale # 2	Bool
						5	High Load Scale # 1	Bool
						6	High Load	Bool
						7	Speed Sensor Error	Bool
						8	ROM fail	Bool

						9	RAM fail	Bool
						10	Signal Cell Fail 4 - (Channel 4)	Bool
						11	Signal Cell Fail 3 - (Channel 3)	Bool
						12	Signal Cell Fail 2 - (Scale 2/Channel 2)	Bool
						13	Signal Cell Fail 1 - (Scale 1/Channel 1)	Bool
						14	Signal Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
0	11	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool
						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool
						14	High Rate Scale # 2	Bool
						15	High Rate Scale # 1	Bool
0	12	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool
						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool

						8	AZT OVER LIMIT	Bool
						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool
						12	External Alarm 3	Bool
						13	External Alarm 2	Bool
						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
0	13	Alarms 4	Read	U16	Integer	0	High control neg. deviation scale 2	Bool
						1	High high control pos. deviation scale 2	Bool
						2	High control pos. deviation scale 2	Bool
						3	High high control neg. deviation scale 1	Bool
						4	High control neg. deviation scale 1	Bool
						5	High high control pos. deviation scale 1	Bool
						6	High control pos. deviation scale 1	Bool
						7	Profibus Error	Bool
						8	Not Used	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12-14	Not Used	Bool
						15	HW configuration Changed Slot 4	Bool
0	14	Alarms 5	Read	U16	Integer	0-2	Not Used	Bool
						3	A/D Shutdown Channel 4	Bool
						4	A/D Shutdown Channel 3	Bool
						5	A/D Shutdown Channel 2	Bool
						6	A/D Shutdown Channel 1	Bool
						7	A/D Shutdown	Bool
						8	Multiple load cell imbalance alarm	Bool
						9	AZT Over Limit Step Scale #2	Bool
						10	AZT Over Limit Step Scale #1	Bool

						11	AZT Over Limit Step	Bool
						12	Zero Limit Scale #2	Bool
						13	Zero Limit Scale #1	Bool
						14	Zero Limit	Bool
						15	High high control neg. deviation Scale 2	Bool
0	15	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
0	16	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
0	17	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool

						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
0	18	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool
						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
0	19	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
0	20	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
0	21	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
0	22	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
0	23	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
0	24	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
0	25	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
0	26	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
0	27	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
0	28	Model ID	Read	U16	Integer			

0	29	Zero Number	Read	U32	Long Integer		
0	31	Span Number	Read	IEEE754 Big-endian	Float		
0	33	Rate	Read	IEEE754 Big-endian	Float		
0	35	Load	Read	IEEE754 Big-endian	Float		
0	37	Speed	Read	IEEE754 Big-endian	Float		
0	39	Master Total	Read	IEEE754 Big-endian	Float		
0	41	Reset Total	Read	IEEE754 Big-endian	Float		
0	43	Operator Total	Read	IEEE754 Big-endian	Float		
0	45	Cal Error	Read	IEEE754 Big-endian	Float		

Table 17 – 9101 ProfiBus Read Block 0

Block 0 Offset 7 Bit 0-3 Lookup Table	Bit Position			
	3	2	1	0
Batch Not Running	0	0	0	0
Batch is going To Start	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 18 – Block 0 Offset 7 Bit 0-3 Lookup Table

Read Data Block 1 - Block “1” is the Read block that contains all the registers relevant to the Batch (Load out) function.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
1	5	Batch Number	Read	U16	Integer			
1	6	Batch Deviation	Read	U16	Integer			
1	7	Batch Total	Read	IEEE754 Big-endian	Float			
1	9	Batch Setpoint	Read	IEEE754 Big-endian	Float			
1	11	Batch Preset	Read	IEEE754 Big-endian	Float			
1	13	Batch Preset Setpoint	Read	IEEE754 Big-endian	Float			
1	15	Batch Preact	Read	IEEE754 Big-endian	Float			

Table 19 – 9101 ProfiBus Read Block 1

Read Data Block 2 - Block “2” is the Read block that contains all the registers relevant to Sets and Thresholds.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
2	5	Number of Trials	Read	U16	Integer			
2	6	Zero Reference	Read	U32	Long Integer			
2	8	AZ Deviation	Read	U32	Long Integer			
2	10	Scale Capacity	Read	IEEE754 Big-endian	Float			
2	12	Speed Capacity	Read	IEEE754 Big-endian	Float			
2	14	Load Cell Capacity	Read	IEEE754 Big-endian	Float			
2	16	AZT Correction	Read	IEEE754 Big-endian	Float			
2	18	Auto Zero Max Dev	Read	IEEE754 Big-endian	Float			

2	20	Total AZ %	Read	IEEE754 Big-endian	Float			
2	22	AZT step limit	Read	IEEE754 Big-endian	Float			
2	24	Belt Warm	Read	IEEE754 Big-endian	Float			
2	26	High Rate Set	Read	IEEE754 Big-endian	Float			
2	28	Low Rate Set	Read	IEEE754 Big-endian	Float			
2	30	High Speed Set	Read	IEEE754 Big-endian	Float			
2	32	Low Speed Set	Read	IEEE754 Big-endian	Float			
2	34	High Load Set	Read	IEEE754 Big-endian	Float			
2	36	Low Load Set	Read	IEEE754 Big-endian	Float			

Table 20 – 9101 ProfiBus Read Block 2

Write Data Block 100 - Block “100” is the Write block that is used to drive (set-reset) outputs as well as to send Commands to the Micro-Tech 9105.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
100	5	Command	Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
8	Remote start R-Cal	Bool						

						9	Reset short-term total	Bool
						10	Reset operator total	Bool
						11-15	Unused	Bool
100	7	Last Key Pressed	Write	U16	Integer			
100	9	Set Digital Output 1	Write	U16	Integer			
100	10	Set Digital Output 2	Write	U16	Integer			
100	11	Set Digital Output 3	Write	U16	Integer			
100	12	Set Digital Output 4	Write	U16	Integer			
100	13	Set Digital Output 5	Write	U16	Integer			

Table 21 – 9101 ProfiBus Write Block 100

Write Data Block 101 - Block “101” is the Write block used to manage the registers relevant to the Batch (Load out) function.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
101	5	Batch Number	Write	U16	Integer			
101	6	Batch Deviation	Write	U16	Integer			
101	7	Batch Setpoint	Write	IEEE754 Big-endian	Float			
101	9	Batch Preset	Write	IEEE754 Big-endian	Float			
101	11	Batch Preact	Write	IEEE754 Big-endian	Float			

Table 22 – 9101 ProfiBus Write Block 101

Write Data Block 102 - Block “102” is the Write block used to manage the registers relevant to Sets and Thresholds.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
102	5	Number of Trials	Write	U16	Integer			
102	6	Scale Capacity	Write	IEEE754 Big-endian	Float			

102	8	Speed Capacity	Write	IEEE754 Big-endian	Float			
102	10	Load Cell Capacity	Write	IEEE754 Big-endian	Float			
102	12	Auto Zero Max Dev	Write	IEEE754 Big-endian	Float			
102	14	AZT step limit	Write	IEEE754 Big-endian	Float			
102	16	Belt Warm	Write	IEEE754 Big-endian	Float			
102	18	High Rate Set	Write	IEEE754 Big-endian	Float			
102	20	Low Rate Set	Write	IEEE754 Big-endian	Float			
102	22	High Speed Set	Write	IEEE754 Big-endian	Float			
102	24	Low Speed Set	Write	IEEE754 Big-endian	Float			
102	26	High Load Set	Write	IEEE754 Big-endian	Float			
102	28	Low Load Set	Write	IEEE754 Big-endian	Float			

Table 23 – 9101 ProfiBus Write Block 102






Micro-Tech 9105

Weigh Feeder Communication Options

Overview

This section provides information on communication options and setup for the Micro-Tech 9105 Feeder Controller (Weigh Feeder Controller).

Communication Protocol Options

Communication Protocol		 TCP	 RTU			Siemens 3964R Allen-Bradley DF1
Supported by Ramsey	Yes	Yes	Yes	Yes	No	No
Standard Communication Option	Yes	Yes	Yes	Yes - Ramsey Option Card Required (Part number 102936)	No – 3 rd Party Protocol Convertor Required	Legacy Protocol and Not Supported by Ramsey
Communication Layer	Ethernet	Ethernet	Serial RS485 Full Duplex (4 Wire)	Serial	Ethernet	Serial
9105 Controller Software	141.00.02.01	141.00.02.01	141.00.02.01	141.00.02.01	141.00.02.01	141.00.02.01
Communication Setup File	EDS_9105_141_00_02_01.eds			GSD_9105_141_00_02_01.gsd	----	----
Setup Requirements	IP Address Mask Address Gateway Address	IP Address Mask Address Gateway Address	Device Address Baud Rate Parity Stop Bits Data Size	Slot Number Device Address	See ProfiNet protocol convertor instructions. Use Modbus TCP or Ethernet/IP setup instructions.	These legacy communication options may work but have not been tested by Ramsey.

EtherNet/IP **Micro-Tech 9105 Ethernet/IP Register Table**

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9105 are as follows.

- **REC4298** 9105 9205 Feeder Controller Reference Manual – All languages and all revisions.
- **REC4299** 9105 9205 Feeder Controller User Manual – All languages and all revisions.

Software Version Information

This version of the Ethernet/IP Register has only been tested with the most recent 9105 software version **141.00.02.01**

These Ethernet/IP registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 141.00.02.01 is available as a software update, please contact your Ramsey distributor.

EDS Version Information

This version of the 9105 software must use the following Electronic Data Sheet (EDS) file, it is the only version of the Ethernet/IP EDS file that has been tested with the 9105 software version 141.00.02.01

- **EDS_9105_141_00_02_01.eds**

This EDS file is available, please contact your Ramsey distributor. Updating the EDS file on the PLC may require modifications to the connected PLC program if using older software versions of the 9105.

Ethernet/IP Setup Information

Ethernet/IP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Ethernet/IP Device Identity Parameters

The Device Identity Parameters are the core identification attributes from the Common Industrial Protocol (CIP) Identity Object used by scanners to electronically key and recognize the exact device model during connection establishment. These are found in the EDS file for the 9105 controller, but listed below as well.

- Vendor ID = 1322
- Device Type = 43
- Major Revision = 2
- Minor Revision = 37
- Product Name = 9105

**Ethernet/IP
Assembly
Instance
Parameters**

The Assembly Instance Parameters define the cyclic I/O data blocks exchanged over EtherNet/IP implicit connections, specifying the Input Assembly Instance (9105 → PLC), Output Assembly Instance (PLC → 9105), and Configuration Assembly Instance, along with their respective data sizes and byte ordering. This information can be found, or calculated, from the EDS file for the 9105 controller, but listed below as well.

Configuration

- Assembly Instance = 1
- Data Size = 0 bytes (8 bits)

Output

- Assembly Instance = 112
- Data Size = 196 bytes (8 bits)

Input

- Assembly Instance = 100
- Data Size = 280 bytes (8 bits)

**Ethernet/IP
Data Timing**

From power on, the Ethernet/IP connection will take approximately 30 seconds to be established. The Requested Packet Interval (RPI) must be set to 100ms minimum.

Input Data Table – The Input data table contains information that is read from the 9105 by the connected PLC.

Instance	Offset	Description	Access	Format	Type	Bit Position	Description	Type
Input	0	Success Flag	Read	U16	Integer			
Input	1	Status LED	Read	U16	Integer	0	Ready LED 1 (Green Solid)	Bool
						1	Batch LED 2 (Green)	Bool
						2	Alarm LED 3 (Red Flash)	Bool
						3	Zero or Span Calibration LED 4 (Red Solid)	Bool
						4	Zero w LED 1 (Green Solid)	Bool
						5	Remote LED 4 (Green Solid)	Bool
						6	Auto LED 2 (Green Solid)	Bool
						7-15	Not Used	Bool
Input	2	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool
						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
Input	3	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-11	Not Used	Bool
						12	High-High Negative Deviation	Bool
						13	High Negative Deviation	Bool
						14	High-High Positive Deviation	Bool
						15	High Positive Deviation	Bool
Input	4	Status 3	Read	U16	Integer	0-15	Not Used	Bool

Input	5	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	6	Alarms 1	Read	U16	Integer	0	High Rate	Bool
						1	Low Load Scale # 2	Bool
						2	Low Load Scale # 1	Bool
						3	Low Load	Bool
						4	High Load Scale # 2	Bool
						5	High Load Scale # 1	Bool
						6	High Load	Bool
						7	Speed Sensor Error	Bool
						8	ROM fail	Bool
						9	RAM fail	Bool
						10	Signal Cell Fail 4 - (Channel 4)	Bool
						11	Signal Cell Fail 3 - (Channel 3)	Bool
						12	Signal Cell Fail 2 - (Scale 2/Channel 2)	Bool
						13	Signal Cell Fail 1 - (Scale 1/Channel 1)	Bool
						14	Signal Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
Input	7	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool
						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool

						14	High Rate Scale # 2	Bool
						15	High Rate Scale # 1	Bool
Input	8	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool
						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool
						8	AZT OVER LIMIT	Bool
						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool
						12	External Alarm 3	Bool
						13	External Alarm 2	Bool
						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
Input	9	Alarms 4	Read	U16	Integer	0	High control neg. deviation scale 2	Bool
						1	High high control pos. deviation scale 2	Bool
						2	High control pos. deviation scale 2	Bool
						3	High high control neg. deviation scale 1	Bool
						4	High control neg. deviation scale 1	Bool
						5	High high control pos. deviation scale 1	Bool
						6	High control pos. deviation scale 1	Bool
						7	ProfiBus Error	Bool
						8	Not Used	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12-14	Not Used	Bool

						15	HW configuration Changed Slot 4	Bool
Input	10	Alarms 5	Read	U16	Integer	0-2	Not Used	Bool
						3	A/D Shutdown Channel 4	Bool
						4	A/D Shutdown Channel 3	Bool
						5	A/D Shutdown Channel 2	Bool
						6	A/D Shutdown Channel 1	Bool
						7	A/D Shutdown	Bool
						8	Multiple load cell imbalance alarm	Bool
						9	AZT Over Limit Step Scale #2	Bool
						10	AZT Over Limit Step Scale #1	Bool
						11	AZT Over Limit Step	Bool
						12	Zero Limit Scale #2	Bool
						13	Zero Limit Scale #1	Bool
						14	Zero Limit	Bool
						15	High high control neg. deviation Scale 2	Bool
Input	11	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
Input	12	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool

Input	13	I/O 2	Read	U16	Integer	0-1 2 3 4 5 6-7 8 9 10 11 12 13 14 15	Not Used Output 1 - Digital Input Board Output 2 - Digital Input Board Output 3 - Digital Input Board Output 4 - Digital Input Board Not Used Input 1 - Digital 8In/8Out Board #2 Input 2 - Digital 8In/8Out Board #2 Input 3 - Digital 8In/8Out Board #2 Input 4 - Digital 8In/8Out Board #2 Input 5 - Digital 8In/8Out Board #2 Input 6 - Digital 8In/8Out Board #2 Input 7 - Digital 8In/8Out Board #2 Input 8 - Digital 8In/8Out Board #2	Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool
Input	14	I/O 3	Read	U16	Integer	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Output 1 - Digital 8In/8Out Board #2 Output 2 - Digital 8In/8Out Board #2 Output 3 - Digital 8In/8Out Board #2 Output 4 - Digital 8In/8Out Board #2 Output 5 - Digital 8In/8Out Board #2 Output 6 - Digital 8In/8Out Board #2 Output 7 - Digital 8In/8Out Board #2 Output 8 - Digital 8In/8Out Board #2 Output 1 - Digital 8In/8Out Board #1 Output 2 - Digital 8In/8Out Board #1 Output 3 - Digital 8In/8Out Board #1 Output 4 - Digital 8In/8Out Board #1 Output 5 - Digital 8In/8Out Board #1 Output 6 - Digital 8In/8Out Board #1 Output 7 - Digital 8In/8Out Board #1 Output 8 - Digital 8In/8Out Board #1	Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool
Input	15	I/O 4	Read	U16	Integer	0-15	Not Used	Bool

Input	16	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
Input	17	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
Input	18	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
Input	19	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
Input	20	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
Input	21	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
Input	22	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
Input	23	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
Input	24	Number Of Trials	Read	U16	Integer			
Input	25	Model ID	Read	U16	Integer			
Input	26	Current Calibration Number	Read	U16	Integer			
Input	27	Batch Number	Read	U16	Integer			
Input	28	Batch Deviation	Read	U16	Integer			
Input	29	Free Space	Read	U16	Integer			
Input	30	AZ Deviation	Read	U32	Long Integer			
Input	32	Zero Number	Read	U32	Long Integer			
Input	34	Zero Reference	Read	U32	Long Integer			
Input	36	Set Control Value	Read	U16	Integer			
Input	37	Start Delay	Read	U16	Integer			
Input	38	Proportional Control Band	Read	U16	Integer			
Input	39	Process Variable Damping	Read	U16	Integer			
Input	40	Free Space	Read	U16	Integer			
Input	41	Free Space	Read	U16	Integer			
Input	42	Span Number	Read	IEEE754 Big-endian	Float			
Input	44	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	46	Speed Capacity	Read	IEEE754 Big-endian	Float			

Input	48	Load Cell Capacity	Read	IEEE754 Big-endian	Float			
Input	50	Maximum Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	52	Rate	Read	IEEE754 Big-endian	Float			
Input	54	Load	Read	IEEE754 Big-endian	Float			
Input	56	Speed	Read	IEEE754 Big-endian	Float			
Input	58	Master Total	Read	IEEE754 Big-endian	Float			
Input	60	Reset Total	Read	IEEE754 Big-endian	Float			
Input	62	Operator Total	Read	IEEE754 Big-endian	Float			
Input	64	Batch Total	Read	IEEE754 Big-endian	Float			
Input	66	Batch Setpoint	Read	IEEE754 Big-endian	Float			
Input	68	Batch Preset	Read	IEEE754 Big-endian	Float			
Input	70	Batch Preset Setpoint	Read	IEEE754 Big-endian	Float			
Input	72	Batch Preact	Read	IEEE754 Big-endian	Float			
Input	74	AZT Correction	Read	IEEE754 Big-endian	Float			
Input	76	Auto Zero Max Dev	Read	IEEE754 Big-endian	Float			
Input	78	Total AZ %	Read	IEEE754 Big-endian	Float			
Input	80	AZT step limit	Read	IEEE754 Big-endian	Float			
Input	82	Belt Warm	Read	IEEE754 Big-endian	Float			
Input	84	High Rate Set	Read	IEEE754 Big-endian	Float			

Input	86	Low Rate Set	Read	IEEE754 Big-endian	Float			
Input	88	High Speed Set	Read	IEEE754 Big-endian	Float			
Input	90	Low Speed Set	Read	IEEE754 Big-endian	Float			
Input	92	High Load Set	Read	IEEE754 Big-endian	Float			
Input	94	Low Load Set	Read	IEEE754 Big-endian	Float			
Input	96	High Positive Deviation	Read	IEEE754 Big-endian	Float			
Input	98	High-High Positive Deviation	Read	IEEE754 Big-endian	Float			
Input	100	High Negative Deviation	Read	IEEE754 Big-endian	Float			
Input	102	High-High Negative Deviation	Read	IEEE754 Big-endian	Float			
Input	104	Cal Error	Read	IEEE754 Big-endian	Float			
Input	106	Control Setpoint Serial	Read	IEEE754 Big-endian	Float			
Input	108	Control Setpoint Local	Read	IEEE754 Big-endian	Float			
Input	110	Displayed Setpoint	Read	IEEE754 Big-endian	Float			
Input	112	Product Ratio	Read	IEEE754 Big-endian	Float			
Input	114	Control Deviation	Read	IEEE754 Big-endian	Float			
Input	116	Analog Output 1 Value	Read	IEEE754 Big-endian	Float			
Input	118	Analog Output 2 Value	Read	IEEE754 Big-endian	Float			
Input	120	Analog Output 3 Value	Read	IEEE754 Big-endian	Float			
Input	122	Analog Output 4 Value	Read	IEEE754 Big-endian	Float			

Input	124	Integral (Reset) Time	Read	IEEE754 Big-endian	Float			
Input	126	Derivative (Rate) Time	Read	IEEE754 Big-endian	Float			
Input	128	Control Out	Read	IEEE754 Big-endian	Float			
Input	130	Density capacity	Read	IEEE754 Big-endian	Float			
Input	132	Specific Weight	Read	IEEE754 Big-endian	Float			
Input	134	Density	Read	IEEE754 Big-endian	Float			
Input	136	Free Space	Read	IEEE754 Big-endian	Float			
Input	138	Free Space	Read	IEEE754 Big-endian	Float			

Table 24 – Ethernet/IP 9105 Input Table

Register Status 2 (Offset 2) Bit 0-3 Lookup Table				
Description	Bit Position			
	3	2	1	0
Batch Not Running	0	0	0	0
Batch is going To Start	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 25 – Register Status 2 (Offset 2) Bit 0-3 Lookup Table

Output Data Table – The Output data table contains information that is written from the PLC to the 9105.

Instance	Offset	Description	Access	Format	Type	Bit Position	Description	Type
Output	0	Number Of trials	Write	U16	Integer			
Output	1	Free Space	Write	U16	Integer			
Output	2	Command	Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
						10	Reset operator total	Bool
						11-15	Unused	Bool
Output	4	Last Key Pressed	Write	U16	Integer			
Output	5	Batch Number	Write	U16	Integer			
Output	6	Batch Deviation	Write	U16	Integer			
Output	7	Set Digital Output 1	Write	U16	Integer			
Output	8	Set Digital Output 2	Write	U16	Integer			
Output	9	Set Digital Output 3	Write	U16	Integer			
Output	10	Set Digital Output 4	Write	U16	Integer			
Output	11	Set Digital Output 5	Write	U16	Integer			
Output	12	Set Control Value	Write	U16	Integer			
Output	13	Start Delay	Write	U16	Integer			
Output	14	Proportional Control Band	Write	U16	Integer			
Output	15	Process Variable Damping	Write	U16	Integer			
Output	16	Free Space	Write	U16	Integer			

Output	17	Free Space	Write	U16	Integer		
Output	18	Free Space	Write	U16	Integer		
Output	19	Free Space	Write	U16	Integer		
Output	20	Free Space	Write	U16	Integer		
Output	21	Free Space	Write	U16	Integer		
Output	22	Free Space	Write	U16	Integer		
Output	23	Free Space	Write	U16	Integer		
Output	24	Free Space	Write	U16	Integer		
Output	25	Free Space	Write	U16	Integer		
Output	26	Scale Capacity	Write	IEEE754 Big-endian	Float		
Output	28	Speed Capacity	Write	IEEE754 Big-endian	Float		
Output	30	Load Cell Capacity	Write	IEEE754 Big-endian	Float		
Output	32	Batch Setpoint	Write	IEEE754 Big-endian	Float		
Output	34	Batch Preset	Write	IEEE754 Big-endian	Float		
Output	36	Batch Preset Setpoint	Write	IEEE754 Big-endian	Float		
Output	38	Batch Preact	Write	IEEE754 Big-endian	Float		
Output	40	Auto Zero Max Dev	Write	IEEE754 Big-endian	Float		
Output	42	AZT step limit	Write	IEEE754 Big-endian	Float		
Output	44	Belt Warm	Write	IEEE754 Big-endian	Float		
Output	46	High Rate Set	Write	IEEE754 Big-endian	Float		
Output	48	Low Rate Set	Write	IEEE754 Big-endian	Float		
Output	50	High Speed Set	Write	IEEE754 Big-endian	Float		

Output	52	Low Speed Set	Write	IEEE754 Big-endian	Float			
Output	54	High Load Set	Write	IEEE754 Big-endian	Float			
Output	56	Low Load Set	Write	IEEE754 Big-endian	Float			
Output	58	High Positive Deviation	Write	IEEE754 Big-endian	Float			
Output	60	High-High Positive Deviation	Write	IEEE754 Big-endian	Float			
Output	62	High Negative Deviation	Write	IEEE754 Big-endian	Float			
Output	64	High-High Negative Deviation	Write	IEEE754 Big-endian	Float			
Output	66	Control Setpoint Serial	Write	IEEE754 Big-endian	Float			
Output	68	Product Ratio	Write	IEEE754 Big-endian	Float			
Output	70	Integral (Reset) Time	Write	IEEE754 Big-endian	Float			
Output	72	Derivative (Rate) Time	Write	IEEE754 Big-endian	Float			
Output	74	Density capacity	Write	IEEE754 Big-endian	Float			
Output	76	Specific Weight	Write	IEEE754 Big-endian	Float			
Output	78	Free Space	Write	IEEE754 Big-endian	Float			
Output	80	Free Space	Write	IEEE754 Big-endian	Float			
Output	82	Free Space	Write	IEEE754 Big-endian	Float			
Output	84	Free Space	Write	IEEE754 Big-endian	Float			
Output	86	Free Space	Write	IEEE754 Big-endian	Float			
Output	88	Free Space	Write	IEEE754 Big-endian	Float			

Output	90	Free Space	Write	IEEE754 Big-endian	Float			
Output	92	Free Space	Write	IEEE754 Big-endian	Float			
Output	94	Free Space	Write	IEEE754 Big-endian	Float			
Output	96	Free Space	Write	IEEE754 Big-endian	Float			

Table 26 – Ethernet/IP 9105 Output Table



Micro-Tech 9105 Modbus TCP Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9105 are as follows.

- **REC4298** 9105 9205 Feeder Controller Reference Manual – All languages and all revisions.
- **REC4299** 9105 9205 Feeder Controller User Manual – All languages and all revisions.

Software Version Information

This version of the Modbus Register has only been tested with the most recent 9105 software version **141.00.02.01**

These Modbus TCP registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 141.00.02.01 is available as a software update, please contact your Ramsey distributor.

Modbus TCP Setup Information

The Modbus TCP Ethernet connection is established over port 502 and does not require a Slave ID to function. Modbus TCP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Modbus TCP Data Read

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

The Micro-Tech 9105 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9105 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9105 will return an error or provide incorrect data.

Modbus TCP Data Write

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9105. This may also cause the 9105 to become non-responsive and require a reboot.

Modbus Register	Description	Access	Format	Type	Bit Position	Description	Type
40001	Success Flag	Read	U16	Integer			
40002-40011	Display Line 1 – Total of 20 Characters over the first display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40012-40021	Display Line 2 - Total of 20 Characters over the second display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40022-40031	Display Line 3 - Total of 20 Characters over the third display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40032-40041	Display Line 4 - Total of 20 Characters over the fourth display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40042-40081	Display Line 5 - Total of 80 Characters over the fifth display line,	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40082	Status LED	Read	U16	Integer	0 1 2 3 4 5 6 7-15	Ready LED 1 (Green Solid) Batch LED 2 (Green) Alarm LED 3 (Red Flash) Zero or Span Calibration LED 4 (Red Solid) Zero w LED 1 (Green Solid) Remote LED 4 (Green Solid) Auto LED 2 (Green Solid) Not Used	Bool Bool Bool Bool Bool Bool Bool Bool
40083	Status 1	Read	U16	Integer	0-1 2 3	Not Used Flag Low Speed Flag High Speed	Bool Bool Bool

					4	Flag Low Rate	Bool
					5	Flag High Rate	Bool
					6	Flag Low Load	Bool
					7	Flag High Load	Bool
					8-12	Not Used	Bool
					13	Calibration Running	Bool
					14	Cumulative Alarms Active	Bool
					15	Cumulative Shut Down Active	Bool
40084	Status 2	Read	U16	Integer	0-3	See following table	Bool
					4-11	Not Used	Bool
					12	High-High Negative Deviation	Bool
					13	High Negative Deviation	Bool
					14	High-High Positive Deviation	Bool
					15	High Positive Deviation	Bool
40085	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40086	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40087	Alarms 1	Read	U16	Integer	0	High Rate	Bool
					1	Low Load Scale # 2	Bool
					2	Low Load Scale # 1	Bool
					3	Low Load	Bool
					4	High Load Scale # 2	Bool
					5	High Load Scale # 1	Bool
					6	High Load	Bool
					7	Speed Sensor Error	Bool
					8	ROM fail	Bool
					9	RAM fail	Bool
					10	Signal Cell Fail 4 - (Channel 4)	Bool
					11	Signal Cell Fail 3 - (Channel 3)	Bool
					12	Signal Cell Fail 2 - (Scale 2/Channel 2)	Bool
					13	Signal Cell Fail 1 - (Scale 1/Channel 1)	Bool
					14	Signal Cell Fail (Single Scale)	Bool

					15	Clock Fail	Bool
40088	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
					1	Calibration Time Elapsed (Single Scale)	Bool
					2	Power During Calibration	Bool
					3	Cold Start	Bool
					4	Warm Start	Bool
					5	Low Speed Scale #2	Bool
					6	Low Speed Scale #1	Bool
					7	Low Speed	Bool
					8	High Speed Scale # 2	Bool
					9	High Speed Scale # 1	Bool
					10	High Speed	Bool
					11	Low Rate Scale # 2	Bool
					12	Low Rate Scale # 1	Bool
					13	Low Rate	Bool
					14	High Rate Scale # 2	Bool
15	High Rate Scale # 1	Bool					
40089	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
					1	HW configuration Changed Slot 2	Bool
					2	HW configuration Changed Slot 1	Bool
					3	Batch Deviation Scale #2	Bool
					4	Batch Deviation Scale #1	Bool
					5	Batch Deviation	Bool
					6	AZT Over Limit Scale #2	Bool
					7	AZT Over Limit Scale #1	Bool
					8	AZT OVER LIMIT	Bool
					9	Overflow Totalizer Scale #2	Bool
					10	Overflow Totalizer Scale #1	Bool
					11	Overflow Totalizer	Bool
					12	External Alarm 3	Bool
13	External Alarm 2	Bool					

					14	External Alarm 1	Bool
					15	Calibration Time Elapsed Scale # 2	Bool
40090	Alarms 4	Read	U16	Integer	0	High control neg. deviation scale 2	Bool
					1	High high control pos. deviation scale 2	Bool
					2	High control pos. deviation scale 2	Bool
					3	High high control neg. deviation scale 1	Bool
					4	High control neg. deviation scale 1	Bool
					5	High high control pos. deviation scale 1	Bool
					6	High control pos. deviation scale 1	Bool
					7	Profibus Error	Bool
					8	Not Used	Bool
					9	Communication Error	Bool
					10	Printer Error	Bool
					11	Math Error	Bool
					12-14	Not Used	Bool
					15	HW configuration Changed Slot 4	Bool
40091	Alarms 5	Read	U16	Integer	0-2	Not Used	Bool
					3	A/D Shutdown Channel 4	Bool
					4	A/D Shutdown Channel 3	Bool
					5	A/D Shutdown Channel 2	Bool
					6	A/D Shutdown Channel 1	Bool
					7	A/D Shutdown	Bool
					8	Multiple load cell imbalance alarm	Bool
					9	AZT Over Limit Step Scale #2	Bool
					10	AZT Over Limit Step Scale #1	Bool
					11	AZT Over Limit Step	Bool
					12	Zero Limit Scale #2	Bool
					13	Zero Limit Scale #1	Bool
					14	Zero Limit	Bool
					15	High high control neg. deviation Scale 2	Bool
40092	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool

40093	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
					1	Input 2 - Digital 8In/8Out Board #1	Bool
					2	Input 3 - Digital 8In/8Out Board #1	Bool
					3	Input 4 - Digital 8In/8Out Board #1	Bool
					4	Input 5 - Digital 8In/8Out Board #1	Bool
					5	Input 6 - Digital 8In/8Out Board #1	Bool
					6	Input 7 - Digital 8In/8Out Board #1	Bool
					7	Input 8 - Digital 8In/8Out Board #1	Bool
					8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
					9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
					10	Input 3 - Digital Input Board	Bool
					11	Input 4 - Digital Input Board	Bool
					12	Input 5 - Digital Input Board	Bool
					13-15	Not Used	Bool
40094	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
					2	Output 1 - Digital Input Board	Bool
					3	Output 2 - Digital Input Board	Bool
					4	Output 3 - Digital Input Board	Bool
					5	Output 4 - Digital Input Board	Bool
					6-7	Not Used	Bool
					8	Input 1 - Digital 8In/8Out Board #2	Bool
					9	Input 2 - Digital 8In/8Out Board #2	Bool
					10	Input 3 - Digital 8In/8Out Board #2	Bool
					11	Input 4 - Digital 8In/8Out Board #2	Bool
					12	Input 5 - Digital 8In/8Out Board #2	Bool
					13	Input 6 - Digital 8In/8Out Board #2	Bool
					14	Input 7 - Digital 8In/8Out Board #2	Bool
					15	Input 8 - Digital 8In/8Out Board #2	Bool
					40095	I/O 3	Read
1	Output 2 - Digital 8In/8Out Board #2	Bool					

					2	Output 3 - Digital 8In/8Out Board #2	Bool
					3	Output 4 - Digital 8In/8Out Board #2	Bool
					4	Output 5 - Digital 8In/8Out Board #2	Bool
					5	Output 6 - Digital 8In/8Out Board #2	Bool
					6	Output 7 - Digital 8In/8Out Board #2	Bool
					7	Output 8 - Digital 8In/8Out Board #2	Bool
					8	Output 1 - Digital 8In/8Out Board #1	Bool
					9	Output 2 - Digital 8In/8Out Board #1	Bool
					10	Output 3 - Digital 8In/8Out Board #1	Bool
					11	Output 4 - Digital 8In/8Out Board #1	Bool
					12	Output 5 - Digital 8In/8Out Board #1	Bool
					13	Output 6 - Digital 8In/8Out Board #1	Bool
					14	Output 7 - Digital 8In/8Out Board #1	Bool
					15	Output 8 - Digital 8In/8Out Board #1	Bool
40096	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
40097	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
40098	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
40099	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
40100	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
40101	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
40102	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
40103	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
40104	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
40105	Number Of trials	Read/Write	U16	Integer			
40106	Command	Read/Write	U32	Long Integer	0-15	Not Used	Bool
					0	Acknowledge Alarms	Bool
					1	Batch Start	Bool
					2	Batch Abort	Bool
					3	Batch Standby	Bool
4	Remote Acquire new Zero or Span	Bool					

					5	Remote start zero	Bool
					6	Remote start weights calibration	Bool
					7	Remote start chain calibration	Bool
					8	Remote start R-Cal	Bool
					9	Reset short-term total	Bool
					10	Reset operator total	Bool
					11-15	Unused	Bool
40108	Last Key Pressed	Read/ Write	U16	Integer			
40109	Model ID	Read	U16	Integer			
40110	Current Calibration Number	Read	U16	Integer			
40111	Batch Number	Read/ Write	U16	Integer			
40112	Batch Deviation	Read/ Write	U16	Integer			
40113	AZ Deviation	Read	U32	Long Integer			
40115	Zero Number	Read	U32	Long Integer			
40117	Zero Reference	Read	U32	Long Integer			
40119	Set Digital Output 1	Read/ Write	U16	Integer			
40120	Set Digital Output 2	Read/ Write	U16	Integer			
40121	Set Digital Output 3	Read/ Write	U16	Integer			
40122	Set Digital Output 4	Read/ Write	U16	Integer			
40123	Set Digital Output 5	Read/ Write	U16	Integer			
40124	Set Control Value	Read/ Write	U16	Integer			
40125	Start Delay	Read/ Write	U16	Integer			

40126	Proportional Control Band	Read/Write	U16	Integer			
40127	Process Variable Damping	Read/Write	U16	Integer			
40128	Free Space	Read	U16	Integer			
40129	Free Space	Read	U16	Integer			
40130	Free Space	Read	U16	Integer			
40131	Free Space	Read	U16	Integer			
40132	Free Space	Read	U16	Integer			
40133	Free Space	Read	U16	Integer			
40134	Free Space	Read	U16	Integer			
40135	Free Space	Read	U16	Integer			
40136	Free Space	Read	U16	Integer			
40137	Free Space	Read	U16	Integer			
40138	Span Number	Read	IEEE754 Big-endian	Float			
40140	Scale Capacity	Read/Write	IEEE754 Big-endian	Float			
40142	Speed Capacity	Read	IEEE754 Big-endian	Float			
40144	Load Cell Capacity	Read/Write	IEEE754 Big-endian	Float			
40146	Maximum Scale Capacity	Read	IEEE754 Big-endian	Float			
40148	Rate	Read	IEEE754 Big-endian	Float			
40150	Load	Read	IEEE754 Big-endian	Float			
40152	Speed	Read	IEEE754 Big-endian	Float			
40154	Master Total	Read	IEEE754 Big-endian	Float			
40156	Reset Total	Read/Write	IEEE754 Big-endian	Float			

40158	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40160	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40162	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40164	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40166	Batch Preset Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40168	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40170	AZT Correction	Read	IEEE754 Big-endian	Float			
40172	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40174	Total AZ %	Read	IEEE754 Big-endian	Float			
40176	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40178	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40180	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40182	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40184	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40186	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40188	High Load Set	Read/ Write	IEEE754 Big-endian	Float			
40190	Low Load Set	Read/ Write	IEEE754 Big-endian	Float			
40192	High Positive Deviation	Read/ Write	IEEE754 Big-endian	Float			
40194	High-High Positive Deviation	Read/ Write	IEEE754 Big-endian	Float			

40196	High Negative Deviation	Read/ Write	IEEE754 Big-endian	Float			
40198	High-High Negative Deviation	Read/ Write	IEEE754 Big-endian	Float			
40200	Cal Error	Read	IEEE754 Big-endian	Float			
40202	Control Setpoint Serial	Read/ Write	IEEE754 Big-endian	Float			
40204	Control Setpoint Local	Read	IEEE754 Big-endian	Float			
40206	Displayed Setpoint	Read	IEEE754 Big-endian	Float			
40208	Product Ratio	Read/ Write	IEEE754 Big-endian	Float			
40210	Control Deviation	Read	IEEE754 Big-endian	Float			
40212	Analog Output 1 Value	Read	IEEE754 Big-endian	Float			
40214	Analog Output 2 Value	Read	IEEE754 Big-endian	Float			
40216	Analog Output 3 Value	Read	IEEE754 Big-endian	Float			
40218	Analog Output 4 Value	Read	IEEE754 Big-endian	Float			
40220	Integral (Reset) Time	Read/ Write	IEEE754 Big-endian	Float			
40222	Derivative (Rate) Time	Read/ Write	IEEE754 Big-endian	Float			
40224	Control Out	Read/ Write	IEEE754 Big-endian	Float			
40226	Density capacity	Read/ Write	IEEE754 Big-endian	Float			
40228	Specific Weight	Read/ Write	IEEE754 Big-endian	Float			
40230	Density	Read	IEEE754 Big-endian	Float			
40232	Master Total Double	Read	IEEE754 Big-endian	Long Float			

40236	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40240	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40244	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40248	Free Space	Read	IEEE754 Big-endian	Float			
40249	Free Space	Read	IEEE754 Big-endian	Float			
40250	Free Space	Read	IEEE754 Big-endian	Float			
40251	Free Space	Read	IEEE754 Big-endian	Float			
40252	Free Space	Read	IEEE754 Big-endian	Float			
40253	Free Space	Read	IEEE754 Big-endian	Float			
40254	Free Space	Read	IEEE754 Big-endian	Float			
40255	Free Space	Read	IEEE754 Big-endian	Float			
40256	Free Space	Read	IEEE754 Big-endian	Float			
40257	Free Space	Read	IEEE754 Big-endian	Float			

Table 27 – Modbus RTU Register Table

Register 40084 Bit 0-3 Lookup Table	Bit Position			
Description	3	2	1	0
Batch Not Running	0	0	0	0
Batch is going To Start	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1

Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 28 – Modbus Register Bit 0-3 Lookup Table



Micro-Tech 9105 Modbus RTU Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9105 and 9205 are as follows.

- **REC4298** 9105 9205 Feeder Controller Reference Manual – All languages and all revisions.
- **REC4299** 9105 9205 Feeder Controller User Manual – All languages and all revisions.

Software Version Information

This version of the Modbus Register has only been tested with the most recent 9105 software version **141.00.02.01**

These Modbus RTU registers have not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 141.00.02.01 is available as a software update, please contact your Ramsey distributor.

Modbus RTU HMI Setup Information

The Modbus RTU connection is established over serial RS485 4 wire. Modbus RTU does not need to be turned on in the Micro-Tech controller, just connect the serial cable and set the information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 5” appears in the LCD display.
- Press the softkey button under the **CommA** text on the screen to enter the Serial setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - Baud Rate = XXXX (9600 default, user defined).
 - Parity = XX (No Parity default, user defined).
 - Stop Bits = XX (1 default, user defined).
 - Word Length = XX (8 default, user defined).
 - Protocol = Modbus
 - Address = XX (1 default, user defined).

Modbus RTU Hardware Setup Information

NOTE – RS485 Full Duplex (4 wire) protocol has been successfully verified and tested by Ramsey. RS485 Half Duplex (2 wire) has been tested by Ramsey and does not work reliably on the 9105 or 9205.

From the factory, the default jumper position is set for RS232, which was used to connect a printer. For Modbus RTU communications, the jumpers need to be set for RS485 Full Duplex (4 wire) as per the following table.

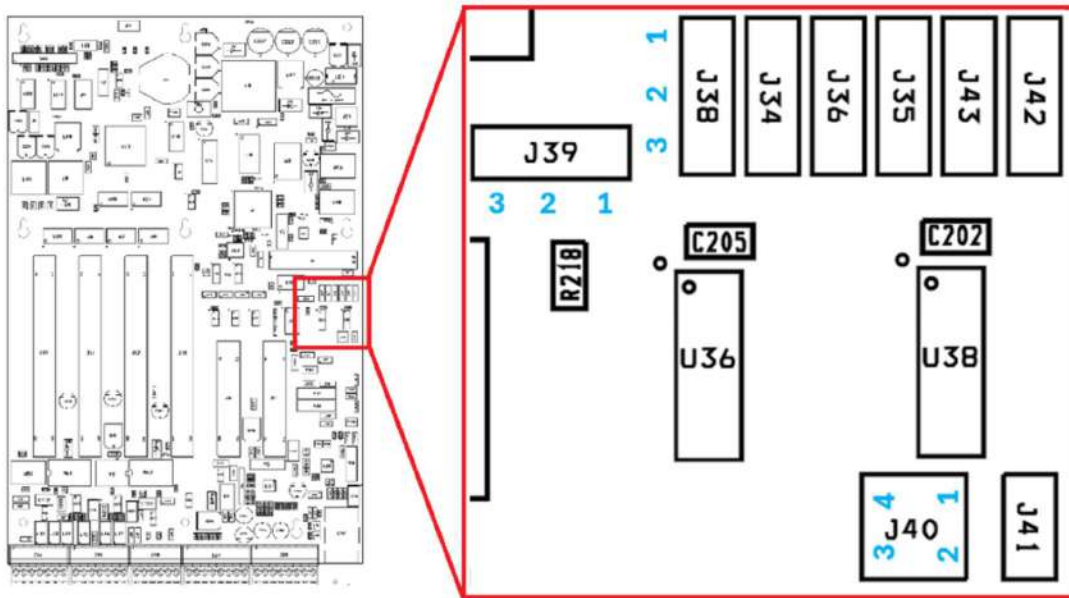


Figure 3 – RS485 4 Wire Jumper Positions

Jumper	J39	J38	J34	J36	J35	J43	J43	J40
RS485 4 Wire – No Termination Resistors	2-3	1-2	1-2	2-3	2-3	1-2	1-2	3-4
RS485 4 Wire – With 120ohm Termination Resistor	2-3	1-2	1-2	2-3	2-3	1-2	1-2	1-2
RS485 4 Wire – With 120ohm Termination Resistor and 600ohm Pull up / Pull Down Bias Resistors	2-3	1-2	1-2	2-3	2-3	2-3	2-3	1-2

Table 29 – RS485 4 Wire Jumper Positions

Modbus RTU Data Read

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

The Micro-Tech 9105 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9105 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9105 will return an error or provide incorrect data.

Modbus RTU Data Write

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9105. This may also cause the 9105 to become non-responsive and require a reboot.

Modbus Register	Description	Access	Format	Type	Bit Position	Description	Type
40001	Success Flag	Read	U16	Integer			
40002-40021	Display Line 1 – Total of 20 Characters over the first display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40022-40041	Display Line 2 - Total of 20 Characters over the second display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40042-40061	Display Line 3 - Total of 20 Characters over the third display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40062-40081	Display Line 4 - Total of 20 Characters over the fourth display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40082	Status LED	Read	U16	Integer	0 1 2 3 4 5 6 7-15	Ready LED 1 (Green Solid) Batch LED 2 (Green) Alarm LED 3 (Red Flash) Zero or Span Calibration LED 4 (Red Solid) Zero w LED 1 (Green Solid) Remote LED 4 (Green Solid) Auto LED 2 (Green Solid) Not Used	Bool Bool Bool Bool Bool Bool Bool Bool
40083	Status 1	Read	U16	Integer	0-1	Not Used	Bool

					2	Flag Low Speed	Bool
					3	Flag High Speed	Bool
					4	Flag Low Rate	Bool
					5	Flag High Rate	Bool
					6	Flag Low Load	Bool
					7	Flag High Load	Bool
					8-12	Not Used	Bool
					13	Calibration Running	Bool
					14	Cumulative Alarms Active	Bool
					15	Cumulative Shut Down Active	Bool
40084	Status 2	Read	U16	Integer	0-3	See following table	Bool
					4-11	Not Used	Bool
					12	High-High Negative Deviation	Bool
					13	High Negative Deviation	Bool
					14	High-High Positive Deviation	Bool
					15	High Positive Deviation	Bool
40085	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40086	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40087	Alarms 1	Read	U16	Integer	0	High Rate	Bool
					1	Low Load Scale # 2	Bool
					2	Low Load Scale # 1	Bool
					3	Low Load	Bool
					4	High Load Scale # 2	Bool
					5	High Load Scale # 1	Bool
					6	High Load	Bool
					7	Speed Sensor Error	Bool
					8	ROM fail	Bool
					9	RAM fail	Bool
					10	Signal Cell Fail 4 - (Channel 4)	Bool
					11	Signal Cell Fail 3 - (Channel 3)	Bool
					12	Signal Cell Fail 2 - (Scale 2/Channel 2)	Bool

					13	Signal Cell Fail 1 - (Scale 1/Channel 1)	Bool
					14	Signal Cell Fail (Single Scale)	Bool
					15	Clock Fail	Bool
40088	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
					1	Calibration Time Elapsed (Single Scale)	Bool
					2	Power During Calibration	Bool
					3	Cold Start	Bool
					4	Warm Start	Bool
					5	Low Speed Scale #2	Bool
					6	Low Speed Scale #1	Bool
					7	Low Speed	Bool
					8	High Speed Scale # 2	Bool
					9	High Speed Scale # 1	Bool
					10	High Speed	Bool
					11	Low Rate Scale # 2	Bool
					12	Low Rate Scale # 1	Bool
					13	Low Rate	Bool
					14	High Rate Scale # 2	Bool
15	High Rate Scale # 1	Bool					
40089	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
					1	HW configuration Changed Slot 2	Bool
					2	HW configuration Changed Slot 1	Bool
					3	Batch Deviation Scale #2	Bool
					4	Batch Deviation Scale #1	Bool
					5	Batch Deviation	Bool
					6	AZT Over Limit Scale #2	Bool
					7	AZT Over Limit Scale #1	Bool
					8	AZT OVER LIMIT	Bool
					9	Overflow Totalizer Scale #2	Bool
					10	Overflow Totalizer Scale #1	Bool
					11	Overflow Totalizer	Bool

					12	External Alarm 3	Bool
					13	External Alarm 2	Bool
					14	External Alarm 1	Bool
					15	Calibration Time Elapsed Scale # 2	Bool
40090	Alarms 4	Read	U16	Integer	0	High control neg. deviation scale 2	Bool
					1	High high control pos. deviation scale 2	Bool
					2	High control pos. deviation scale 2	Bool
					3	High high control neg. deviation scale 1	Bool
					4	High control neg. deviation scale 1	Bool
					5	High high control pos. deviation scale 1	Bool
					6	High control pos. deviation scale 1	Bool
					7	ProfiBus Error	Bool
					8	Not Used	Bool
					9	Communication Error	Bool
					10	Printer Error	Bool
					11	Math Error	Bool
					12-14	Not Used	Bool
					15	HW configuration Changed Slot 4	Bool
					40091	Alarms 5	Read
3	A/D Shutdown Channel 4	Bool					
4	A/D Shutdown Channel 3	Bool					
5	A/D Shutdown Channel 2	Bool					
6	A/D Shutdown Channel 1	Bool					
7	A/D Shutdown	Bool					
8	Multiple load cell imbalance alarm	Bool					
9	AZT Over Limit Step Scale #2	Bool					
10	AZT Over Limit Step Scale #1	Bool					
11	AZT Over Limit Step	Bool					
12	Zero Limit Scale #2	Bool					
13	Zero Limit Scale #1	Bool					
14	Zero Limit	Bool					

					15	High high control neg. deviation Scale 2	Bool
40092	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
40093	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
					1	Input 2 - Digital 8In/8Out Board #1	Bool
					2	Input 3 - Digital 8In/8Out Board #1	Bool
					3	Input 4 - Digital 8In/8Out Board #1	Bool
					4	Input 5 - Digital 8In/8Out Board #1	Bool
					5	Input 6 - Digital 8In/8Out Board #1	Bool
					6	Input 7 - Digital 8In/8Out Board #1	Bool
					7	Input 8 - Digital 8In/8Out Board #1	Bool
					8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
					9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
					10	Input 3 - Digital Input Board	Bool
					11	Input 4 - Digital Input Board	Bool
					12	Input 5 - Digital Input Board	Bool
					13-15	Not Used	Bool
40094	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
					2	Output 1 - Digital Input Board	Bool
					3	Output 2 - Digital Input Board	Bool
					4	Output 3 - Digital Input Board	Bool
					5	Output 4 - Digital Input Board	Bool
					6-7	Not Used	Bool
					8	Input 1 - Digital 8In/8Out Board #2	Bool
					9	Input 2 - Digital 8In/8Out Board #2	Bool
					10	Input 3 - Digital 8In/8Out Board #2	Bool
					11	Input 4 - Digital 8In/8Out Board #2	Bool
					12	Input 5 - Digital 8In/8Out Board #2	Bool
					13	Input 6 - Digital 8In/8Out Board #2	Bool
					14	Input 7 - Digital 8In/8Out Board #2	Bool
					15	Input 8 - Digital 8In/8Out Board #2	Bool

40095	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
					1	Output 2 - Digital 8In/8Out Board #2	Bool
					2	Output 3 - Digital 8In/8Out Board #2	Bool
					3	Output 4 - Digital 8In/8Out Board #2	Bool
					4	Output 5 - Digital 8In/8Out Board #2	Bool
					5	Output 6 - Digital 8In/8Out Board #2	Bool
					6	Output 7 - Digital 8In/8Out Board #2	Bool
					7	Output 8 - Digital 8In/8Out Board #2	Bool
					8	Output 1 - Digital 8In/8Out Board #1	Bool
					9	Output 2 - Digital 8In/8Out Board #1	Bool
					10	Output 3 - Digital 8In/8Out Board #1	Bool
					11	Output 4 - Digital 8In/8Out Board #1	Bool
					12	Output 5 - Digital 8In/8Out Board #1	Bool
					13	Output 6 - Digital 8In/8Out Board #1	Bool
					14	Output 7 - Digital 8In/8Out Board #1	Bool
					15	Output 8 - Digital 8In/8Out Board #1	Bool
40096	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
40097	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
40098	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
40099	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
40100	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
40101	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
40102	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
40103	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
40104	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
40105	Number Of trials	Read/Write	U16	Integer			
40106	Command	Read/Write	U32	Long Integer	0-15	Not Used	Bool
					0	Acknowledge Alarms	Bool
					1	Batch Start	Bool
					2	Batch Abort	Bool

					3	Batch Standby	Bool
					4	Remote Acquire new Zero or Span	Bool
					5	Remote start zero	Bool
					6	Remote start weights calibration	Bool
					7	Remote start chain calibration	Bool
					8	Remote start R-Cal	Bool
					9	Reset short-term total	Bool
					10	Reset operator total	Bool
					11-15	Unused	Bool
40108	Last Key Pressed	Read/Write	U16	Integer			
40109	Model ID	Read	U16	Integer			
40110	Current Calibration Number	Read	U16	Integer			
40111	Batch Number	Read/Write	U16	Integer			
40112	Batch Deviation	Read/Write	U16	Integer			
40113	AZ Deviation	Read	U32	Long Integer			
40115	Zero Number	Read	U32	Long Integer			
40117	Zero Reference	Read	U32	Long Integer			
40119	Set Digital Output 1	Read/Write	U16	Integer			
40120	Set Digital Output 2	Read/Write	U16	Integer			
40121	Set Digital Output 3	Read/Write	U16	Integer			
40122	Set Digital Output 4	Read/Write	U16	Integer			
40123	Set Digital Output 5	Read/Write	U16	Integer			
40124	Set Control Value	Read/Write	U16	Integer			

40125	Start Delay	Read/Write	U16	Integer			
40126	Proportional Control Band	Read/Write	U16	Integer			
40127	Process Variable Damping	Read/Write	U16	Integer			
40128	Free Space	Read	U16	Integer			
40129	Free Space	Read	U16	Integer			
40130	Free Space	Read	U16	Integer			
40131	Free Space	Read	U16	Integer			
40132	Free Space	Read	U16	Integer			
40133	Free Space	Read	U16	Integer			
40134	Free Space	Read	U16	Integer			
40135	Free Space	Read	U16	Integer			
40136	Free Space	Read	U16	Integer			
40137	Free Space	Read	U16	Integer			
40138	Span Number	Read	IEEE754 Big-endian	Float			
40140	Scale Capacity	Read/Write	IEEE754 Big-endian	Float			
40142	Speed Capacity	Read	IEEE754 Big-endian	Float			
40144	Load Cell Capacity	Read/Write	IEEE754 Big-endian	Float			
40146	Maximum Scale Capacity	Read	IEEE754 Big-endian	Float			
40148	Rate	Read	IEEE754 Big-endian	Float			
40150	Load	Read	IEEE754 Big-endian	Float			
40152	Speed	Read	IEEE754 Big-endian	Float			
40154	Master Total	Read	IEEE754 Big-endian	Float			

40156	Reset Total	Read/ Write	IEEE754 Big-endian	Float			
40158	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40160	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40162	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40164	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40166	Batch Preset Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40168	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40170	AZT Correction	Read	IEEE754 Big-endian	Float			
40172	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40174	Total AZ %	Read	IEEE754 Big-endian	Float			
40176	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40178	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40180	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40182	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40184	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40186	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40188	High Load Set	Read/ Write	IEEE754 Big-endian	Float			
40190	Low Load Set	Read/ Write	IEEE754 Big-endian	Float			
40192	High Positive Deviation	Read/ Write	IEEE754 Big-endian	Float			

40194	High-High Positive Deviation	Read/ Write	IEEE754 Big-endian	Float			
40196	High Negative Deviation	Read/ Write	IEEE754 Big-endian	Float			
40198	High-High Negative Deviation	Read/ Write	IEEE754 Big-endian	Float			
40200	Cal Error	Read	IEEE754 Big-endian	Float			
40202	Control Setpoint Serial	Read/ Write	IEEE754 Big-endian	Float			
40204	Control Setpoint Local	Read	IEEE754 Big-endian	Float			
40206	Displayed Setpoint	Read	IEEE754 Big-endian	Float			
40208	Product Ratio	Read/ Write	IEEE754 Big-endian	Float			
40210	Control Deviation	Read	IEEE754 Big-endian	Float			
40212	Analog Output 1 Value	Read	IEEE754 Big-endian	Float			
40214	Analog Output 2 Value	Read	IEEE754 Big-endian	Float			
40216	Analog Output 3 Value	Read	IEEE754 Big-endian	Float			
40218	Analog Output 4 Value	Read	IEEE754 Big-endian	Float			
40220	Integral (Reset) Time	Read/ Write	IEEE754 Big-endian	Float			
40222	Derivative (Rate) Time	Read/ Write	IEEE754 Big-endian	Float			
40224	Control Out	Read/ Write	IEEE754 Big-endian	Float			
40226	Density capacity	Read/ Write	IEEE754 Big-endian	Float			
40228	Specific Weight	Read/ Write	IEEE754 Big-endian	Float			
40230	Density	Read	IEEE754 Big-endian	Float			

40232	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40236	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40240	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40244	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40248	Free Space	Read	IEEE754 Big-endian	Float			
40249	Free Space	Read	IEEE754 Big-endian	Float			
40250	Free Space	Read	IEEE754 Big-endian	Float			
40251	Free Space	Read	IEEE754 Big-endian	Float			
40252	Free Space	Read	IEEE754 Big-endian	Float			
40253	Free Space	Read	IEEE754 Big-endian	Float			
40254	Free Space	Read	IEEE754 Big-endian	Float			
40255	Free Space	Read	IEEE754 Big-endian	Float			
40256	Free Space	Read	IEEE754 Big-endian	Float			
40257	Free Space	Read	IEEE754 Big-endian	Float			

Table 30 – Modbus RTU Register Table

Register 40084 Bit 0-3 Lookup Table	Bit Position			
Description	3	2	1	0
Batch Not Running	0	0	0	0
Batch is going To Start	0	0	0	1
Batch is Running at High Rate	0	0	1	0

Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 31 – Modbus Register Bit 0-3 Lookup Table



Micro-Tech 9105 ProfiBus Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9105 are as follows.

- **REC4298** 9105 9205 Feeder Controller Reference Manual – All languages and all revisions.
- **REC4299** 9105 9205 Feeder Controller User Manual – All languages and all revisions.
- **REC4372** 9000 ProfiBus-DP Protocol Manual – All languages and all revisions.

Software Version Information

This version of the ProfiBus Register has only been tested with the most recent 9105 software version as noted below.

- **141.00.02.01**

Functioning of ProfiBus has not been tested or verified with any other software version. Ramsey are not supporting older software versions. The software version 141.00.02.01 is available as a software update, please contact your Ramsey distributor.

GSD Version Information

This version of the 9105 software must use the following General Station Description (GSD) file, it is the only version of the ProfiBus GSD file that has been tested with the 9105 software version 141.00.02.01

- **GSD_9105_141_00_02_01.gsd**

This GSD file is available, please contact your Ramsey distributor. Updating the GSD file on the PLC may require modifications to the connected PLC program if using older software versions of the 9105.

NOTE - GSD files have a maximum character length of 12 when being loaded into Siemens TIA portal, so loading this file will result in an error. The file name will need to be shortened by the user prior to loading into TIA portal. Ramsey use a longer file name for version control and tracking purposes.

ProfiBus Setup Information

ProfiBus is not native to the standard 9105 or 9205 and requires an additional option card to function (Part number 102936). If ProfiBus is required and your controller does not have this option card installed, then please contact your Ramsey distributor.

ProfiBus **does** need to be turned on in the Micro-Tech controller and the device ID set. To setup ProfiBus do the following.

- With 9105 powered down, install the ProfiBus card (Part number 102936) into any slot with the larger board connectors (Slots U1, U2, U3 or U4). The end DB9 extender will need to be removed to install the ProfiBus card into the slot – do not force it in or it may damage the option card or main PCB. The end DB9 connector will need to be reinstalled after option card installation so the Siemens style ProfiBus DB9 connector will reach the option card DB9 connector.
- Power on the unit. The screen will display “Slot X Changed – Acquire New Configuration?” to which you must press the **Yes** soft key. If you press No, or the screen times out, then the ProfiBus option card is not configured and will not

communicate. If either of these happened, then remove the option card, power up, power down then follow the above process again.

- Press the softkey **Menu** button until “Main Menu 5” appears in the LCD display.
- Press the softkey button under the **Profib** text on the screen to enter the ProfiBus setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - Address = XXX (User defined – must be between 0-126).
 - Read Buffer Dimension = 48 words (User defined – suggest to not modify, range of 5-48).
 - Write Buffer Dimension = 48 words (User defined – suggest to not modify, range of 5-48).
 - Variable Selection = Not Damped, Damped, Displayed.

ProfiBus Data Blocks

In the 9105 ProfiBus data is organized in Registers which are then contained inside Data Blocks. These Data Blocks are shown in the table below. Some Data Blocks are “Read only” (RO) while others are “Write Only” (WO). The Micro-Tech 9105 updates the internal registers every 100ms (approximately). Reads of the Data Block at faster rates than 100ms will receive the same data multiple times. The data sent from the 9105 to the Master is in format of MSB first then LSB second.

Block Type	Identification Number	Description of Data
Read	0	Status, Alarms, I/O, Dynamic data
	1	Batch (Load Out)
	2	Sets and Thresholds
	3	Control
Write	100	Status, Alarms, I/O, Dynamic data
	101	Batch (Load Out)
	102	Sets and Thresholds
	103	Control

Table 32 – ProfiBus Block Information

ProfiBus Read

In the ProfiBus protocol, the Master continuously reads data from the 9105 Read buffer. The 9105 starts to update the Read buffer with the Registers contained in Block 0 immediately from Power On, and will continue to do so until instructed to populate different information into the Read buffer.

To change data in the Read buffer from Block 0 to Block 1, 2 or 3 requires a Write message to be sent from the Master to the 9105.

ID	Offset	Description	Data Type	Bit Position	Description
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1	1	<p>Block Identifier</p> <p>This determines which Data Block gets copied into the Read buffer, and therefore determines what data is being read by the ProfiBus Master.</p>	Integer	<p>0</p> <p>0 = Block 0 1 = Block 1 2 = Block 2 3 = Block 3</p>
				<p>1-7</p> <p>Not Used</p>
				<p>8</p> <p>0 = Scale 1 1 = Scale 2 2 = Scale 3 3 = Scale 4</p>
				<p>9-15</p> <p>Not Used</p>
2	2	<p>1st Register</p> <p>From within the Data Block requested, what is the first Register that should be read. A value of 0 means the first register onwards will be placed in the Read buffer.</p>	Integer	
3	3	<p>Number of Registers</p> <p>From the first Register specified within the Data Block, how many Registers should be transferred into the Read Buffer. A value of 0 means the entire Data Block is placed into the Buffer.</p>	Integer	
4	4	<p>Stamp</p> <p>To avoid the 9105 interpreting the same Master message over and over again, the 9105 interprets received data only if the stamp value is different from the stamp value received in the previous request. The Master has only to change the stamp value when it creates a new message – in this case a request to change which Data Block to read. The stamp can be any number as long as its different between messages, so a random number or incremental counter value will suffice.</p>	Integer	

Table 33 – Write data to Change Data Block Read

Read Data Block 0 - Block “0” is the Read block that contains all the registers relevant to the Status, Alarms, I/O and Dynamic data. It is the default group the Micro-Tech 9105 sends to the Master for a read request if the Master does not change the requested Data Block.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
0	5	Status LED	Read	U16	Integer	0	Ready LED 1 (Green Solid)	Bool
						1	Batch LED 2 (Green)	Bool

						2	Alarm LED 3 (Red Flash)	Bool
						3	Zero or Span Calibration LED 4 (Red Solid)	Bool
						4	Zero w LED 1 (Green Solid)	Bool
						5	Remote LED 4 (Green Solid)	Bool
						6	Auto LED 2 (Green Solid)	Bool
						7-15	Not Used	Bool
0	6	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool
						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
0	7	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-11	Not Used	Bool
						12	High-High Negative Deviation	Bool
						13	High Negative Deviation	Bool
						14	High-High Positive Deviation	Bool
						15	High Positive Deviation	Bool
0	8	Status 3	Read	U16	Integer	0-15	Not Used	Bool
0	9	Status 4	Read	U16	Integer	0-15	Not Used	Bool
0	10	Alarms 1	Read	U16	Integer	0	High Rate	Bool
						1	Low Load Scale # 2	Bool
						2	Low Load Scale # 1	Bool
						3	Low Load	Bool
						4	High Load Scale # 2	Bool
						5	High Load Scale # 1	Bool

						6	High Load	Bool
						7	Speed Sensor Error	Bool
						8	ROM fail	Bool
						9	RAM fail	Bool
						10	Signal Cell Fail 4 - (Channel 4)	Bool
						11	Signal Cell Fail 3 - (Channel 3)	Bool
						12	Signal Cell Fail 2 - (Scale 2/Channel 2)	Bool
						13	Signal Cell Fail 1 - (Scale 1/Channel 1)	Bool
						14	Signal Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
0	11	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool
						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool
						14	High Rate Scale # 2	Bool
						15	High Rate Scale # 1	Bool
0	12	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool

						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool
						8	AZT OVER LIMIT	Bool
						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool
						12	External Alarm 3	Bool
						13	External Alarm 2	Bool
						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
0	13	Alarms 4	Read	U16	Integer	0	High control neg. deviation scale 2	Bool
						1	High high control pos. deviation scale 2	Bool
						2	High control pos. deviation scale 2	Bool
						3	High high control neg. deviation scale 1	Bool
						4	High control neg. deviation scale 1	Bool
						5	High high control pos. deviation scale 1	Bool
						6	High control pos. deviation scale 1	Bool
						7	ProfiBus Error	Bool
						8	Not Used	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12-14	Not Used	Bool
						15	HW configuration Changed Slot 4	Bool
0	14	Alarms 5	Read	U16	Integer	0-2	Not Used	Bool
						3	A/D Shutdown Channel 4	Bool
						4	A/D Shutdown Channel 3	Bool
						5	A/D Shutdown Channel 2	Bool
						6	A/D Shutdown Channel 1	Bool
						7	A/D Shutdown	Bool

						8	Multiple load cell imbalance alarm	Bool
						9	AZT Over Limit Step Scale #2	Bool
						10	AZT Over Limit Step Scale #1	Bool
						11	AZT Over Limit Step	Bool
						12	Zero Limit Scale #2	Bool
						13	Zero Limit Scale #1	Bool
						14	Zero Limit	Bool
						15	High high control neg. deviation Scale 2	Bool
0	15	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
0	16	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
0	17	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool

						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
0	18	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool
						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
0	19	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
0	20	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
0	21	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
0	22	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
0	23	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
0	24	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
0	25	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
0	26	I/O 11	Read	U16	Integer	0-15	Not Used	Bool

0	27	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
0	28	Model ID	Read	U16	Integer			
0	29	Current Calibration Number	Read	U16	Integer			
0	30	Zero Number	Read	U32	Long Integer			
0	32	Span Number	Read	IEEE754 Big-endian	Float			
0	34	Rate	Read	IEEE754 Big-endian	Float			
0	36	Load	Read	IEEE754 Big-endian	Float			
0	38	Speed	Read	IEEE754 Big-endian	Float			
0	40	Master Total	Read	IEEE754 Big-endian	Float			
0	42	Reset Total	Read	IEEE754 Big-endian	Float			
0	44	Operator Total	Read	IEEE754 Big-endian	Float			
0	46	Cal Error	Read	IEEE754 Big-endian	Float			

Table 34 – 9105 ProfiBus Read Block 0

Block 0 Offset 7 Bit 0-3 Lookup Table	Bit Position			
	3	2	1	0
Batch Not Running	0	0	0	0
Batch is going To Start	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 35 – Block 0 Offset 7 Bit 0-3 Lookup Table

Read Data Block 1 - Block “1” is the Read block that contains all the registers relevant to the Batch (Load out) function.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
1	5	Batch Number	Read	U16	Integer			
1	6	Batch Deviation	Read	U16	Integer			
1	7	Batch Total	Read	IEEE754 Big-endian	Float			
1	9	Batch Setpoint	Read	IEEE754 Big-endian	Float			
1	11	Batch Preset	Read	IEEE754 Big-endian	Float			
1	13	Batch Preset Setpoint	Read	IEEE754 Big-endian	Float			
1	15	Batch Preact	Read	IEEE754 Big-endian	Float			

Table 36 – 9105 ProfiBus Read Block 1

Read Data Block 2 - Block “2” is the Read block that contains all the registers relevant to Sets and Thresholds.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
2	5	Number of Trials	Read	U16	Integer			
2	6	Zero Reference	Read	U32	Long Integer			
2	8	AZ Deviation	Read	U32	Long Integer			
2	10	Scale Capacity	Read	IEEE754 Big-endian	Float			
2	12	Speed Capacity	Read	IEEE754 Big-endian	Float			
2	14	Load Cell Capacity	Read	IEEE754 Big-endian	Float			

2	16	Maximum Scale Capacity	Read	IEEE754 Big-endian	Float			
2	18	AZT Correction	Read	IEEE754 Big-endian	Float			
2	20	Auto Zero Max Dev	Read	IEEE754 Big-endian	Float			
2	22	Total AZ %	Read	IEEE754 Big-endian	Float			
2	24	AZT step limit	Read	IEEE754 Big-endian	Float			
2	26	Belt Warm	Read	IEEE754 Big-endian	Float			
2	28	High Rate Set	Read	IEEE754 Big-endian	Float			
2	30	Low Rate Set	Read	IEEE754 Big-endian	Float			
2	32	High Speed Set	Read	IEEE754 Big-endian	Float			
2	34	Low Speed Set	Read	IEEE754 Big-endian	Float			
2	36	High Load Set	Read	IEEE754 Big-endian	Float			
2	38	Low Load Set	Read	IEEE754 Big-endian	Float			
2	40	High Positive Deviation	Read	IEEE754 Big-endian	Float			
2	42	High-High Positive Deviation	Read	IEEE754 Big-endian	Float			
2	44	High Negative Deviation	Read	IEEE754 Big-endian	Float			
2	46	High-High Negative Deviation	Read	IEEE754 Big-endian	Float			

Table 37 – 9105 ProfiBus Read Block 2

Read Data Block 3 - Block “3” is the Read block that contains all the registers relevant to the 9105 control parameters.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
3	5	Set Control Value	Read	U16	Integer			
3	6	Start Delay	Read	U16	Integer			
3	7	Proportional Control Band	Read	U16	Integer			
3	8	Process Variable Damping	Read	U16	Integer			
3	9	Control Setpoint Serial	Read	IEEE754 Big-endian	Float			
3	11	Control Setpoint Local	Read	IEEE754 Big-endian	Float			
3	13	Displayed Setpoint	Read	IEEE754 Big-endian	Float			
3	15	Product Ratio	Read	IEEE754 Big-endian	Float			
3	17	Control Deviation	Read	IEEE754 Big-endian	Float			
3	19	Analog Output 1 Value	Read	IEEE754 Big-endian	Float			
3	21	Analog Output 2 Value	Read	IEEE754 Big-endian	Float			
3	23	Analog Output 3 Value	Read	IEEE754 Big-endian	Float			
3	25	Analog Output 4 Value	Read	IEEE754 Big-endian	Float			
3	27	Integral (Reset) Time	Read	IEEE754 Big-endian	Float			
3	29	Derivative (Rate) Time	Read	IEEE754 Big-endian	Float			
3	31	Control Out	Read	IEEE754 Big-endian	Float			
3	33	Density capacity	Read	IEEE754 Big-endian	Float			
3	35	Specific Weight	Read	IEEE754 Big-endian	Float			
3	37	Density	Read	IEEE754 Big-endian	Float			

Table 38 – 9105 ProfiBus Read Block 3

Write Data Block 100 - Block “100” is the Write block that is used to drive (set-reset) outputs as well as to send Commands to the Micro-Tech 9105.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
100	5	Command	Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
						10	Reset operator total	Bool
					11-15	Unused	Bool	
100	7	Last Key Pressed	Write	U16	Integer			
100	9	Set Digital Output 1	Write	U16	Integer			
100	10	Set Digital Output 2	Write	U16	Integer			
100	11	Set Digital Output 3	Write	U16	Integer			
100	12	Set Digital Output 4	Write	U16	Integer			
100	13	Set Digital Output 5	Write	U16	Integer			

Table 39 – 9105 ProfiBus Write Block 100

Write Data Block 101 - Block “101” is the Write block used to manage the registers relevant to the Batch (Load out) function.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
-------	--------	-------------	--------	--------	------	--------------	-------------	------

101	5	Batch Number	Write	U16	Integer		
101	6	Batch Deviation	Write	U16	Integer		
101	7	Batch Setpoint	Write	IEEE754 Big-endian	Float		
101	9	Batch Preset	Write	IEEE754 Big-endian	Float		
101	11	Batch Preset Setpoint	Write	IEEE754 Big-endian	Float		
101	13	Batch Preact	Write	IEEE754 Big-endian	Float		

Table 40 – 9105 ProfiBus Write Block 101

Write Data Block 102 - Block “102” is the Write block used to manage the registers relevant to Sets and Thresholds.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
102	5	Number of Trials	Write	U16	Integer			
102	6	Scale Capacity	Write	IEEE754 Big-endian	Float			
102	8	Speed Capacity	Write	IEEE754 Big-endian	Float			
102	10	Load Cell Capacity	Write	IEEE754 Big-endian	Float			
102	12	Auto Zero Max Dev	Write	IEEE754 Big-endian	Float			
102	14	AZT step limit	Write	IEEE754 Big-endian	Float			
102	16	Belt Warm	Write	IEEE754 Big-endian	Float			
102	18	High Rate Set	Write	IEEE754 Big-endian	Float			
102	20	Low Rate Set	Write	IEEE754 Big-endian	Float			
102	22	High Speed Set	Write	IEEE754 Big-endian	Float			

102	24	Low Speed Set	Write	IEEE754 Big-endian	Float			
102	26	High Load Set	Write	IEEE754 Big-endian	Float			
102	28	Low Load Set	Write	IEEE754 Big-endian	Float			
102	30	High Positive Deviation	Write	IEEE754 Big-endian	Float			
102	32	High-High Positive Deviation	Write	IEEE754 Big-endian	Float			
102	34	High Negative Deviation	Write	IEEE754 Big-endian	Float			
102	36	High-High Negative Deviation	Write	IEEE754 Big-endian	Float			

Table 41 – 9105 ProfiBus Write Block 102

Write Data Block 103 - Block “103” is the Write block used to control the 9105.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
103	5	Set Control Value	Write	U16	Integer			
103	6	Start Delay	Write	U16	Integer			
103	7	Proportional Control Band	Write	U16	Integer			
103	8	Process Variable Damping	Write	U16	Integer			
103	9	Control Setpoint Serial	Write	IEEE754 Big-endian	Float			
103	11	Product Ratio	Write	IEEE754 Big-endian	Float			
103	13	Integral (Reset) Time	Write	IEEE754 Big-endian	Float			
103	15	Derivative (Rate) Time	Write	IEEE754 Big-endian	Float			
103	17	Density capacity	Write	IEEE754 Big-endian	Float			

103	19	Specific Weight	Write	IEEE754 Big-endian	Float			
103	21	Density	Write	IEEE754 Big-endian	Float			

Table 42 – 9105 ProfiBus Write Block 103






Micro-Tech 9301

Trade Certified Belt Scale Integrator Communication Options

Overview

This section provides information on communication options and setup for the Micro-Tech 9301 Trade Certified Belt Scale Integrator.

Communication Protocol Options

Communication Protocol		 TCP	 RTU			Siemens 3964R Allen-Bradley DF1
Supported by Ramsey	Yes	Yes	Yes	Yes	No	No
Standard Communication Option	Yes	Yes	Yes	Yes - Ramsey Option Card Required (Part number 102936)	No – 3 rd Party Protocol Convertor Required	Legacy Protocol and Not Supported by Ramsey
Communication Layer	Ethernet	Ethernet	Serial RS485 Full Duplex (4 Wire)	Serial	Ethernet	Serial
9101 Controller Software	144.00.01.00	144.00.01.00	144.00.01.00	144.00.01.00	144.00.01.00	144.00.01.00
Communication Setup File	EDS_9301_144_00_01_00.eds			GSD_9301_144_00_01_00.gsd	----	----
Setup Requirements	IP Address Mask Address Gateway Address	IP Address Mask Address Gateway Address	Device Address Baud Rate Parity Stop Bits Data Size	Slot Number Device Address	See ProfiNet protocol convertor instructions. Use Modbus TCP or Ethernet/IP setup instructions.	These legacy communication options may work but have not been tested by Ramsey.

EtherNet/IP **Micro-Tech 9301 Ethernet/IP Register Table**

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9301 are as follows.

- **REC4306** 9301 Integrator Reference Manual– All languages and all revisions.
- **REC4307** 9301 Integrator User Manual– All languages and all revisions.
- **REC4372** 9000 ProfiBus-DP Protocol Manual – All languages and all revisions.

Software Version Information

This version of the Modbus RTU Register has been tested with the only software version available for the 9301 Integrator.

- **144.00.01.00**

EDS Version Information

This version of the 9301 software must use the following Electronic Data Sheet (EDS) file, it is the only version of the Ethernet/IP EDS file that has been tested with the 9301 software version 144.00.01.00

- **EDS_9301_144_00_01_00.eds**

This EDS file is available, please contact your Ramsey distributor. Updating the EDS file on the PLC may require modifications to the connected PLC program if using older software versions of the 9301.

Ethernet/IP Setup Information

Ethernet/IP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Ethernet/IP Device Identity Parameters

The Device Identity Parameters are the core identification attributes from the Common Industrial Protocol (CIP) Identity Object used by scanners to electronically key and recognize the exact device model during connection establishment. These are found in the EDS file for the 9101 controller, but listed below as well.

- Vendor ID = 1322
- Device Type = 43
- Major Revision = 2
- Minor Revision = 20
- Product Name = 9301

Ethernet/IP Assembly Instance Parameters

The Assembly Instance Parameters define the cyclic I/O data blocks exchanged over EtherNet/IP implicit connections, specifying the Input Assembly Instance (9101 → PLC), Output Assembly Instance (PLC → 9101), and Configuration Assembly Instance, along with their respective data sizes and byte ordering. This information can be found, or calculated, from the EDS file for the 9101 controller, but listed below as well.

Configuration

- Assembly Instance = 1
- Data Size = 0 bytes (8 bits)

Output

- Assembly Instance = 112
- Data Size = 132 bytes (8 bits)

Input

- Assembly Instance = 100
- Data Size = 232 bytes (8 bits)

Ethernet/IP Data Timing

From power on, the Ethernet/IP connection will take approximately 30 seconds to be established. The Requested Packet Interval (RPI) must be set to 100ms minimum.

The data sent from the 9301 to the Master is in format of MSB first then LSB second.

NOTE – Important! This applies to 9301 only. For 9301 Input Integer Values in offset range 24 to 32 (Number Of Trials, Model ID, Batch Number, Batch Deviation, AZ Deviation, Zero Number, Zero Reference) these registers have data sent in LSB first, not MSB first. This must be rectified in the PLC program. The other Floating Point registers are sent MSB first as normal.

Input Data Table – The Input data table contains information that is read from the 9105 by the connected PLC.

Instance	Offset	Scale	Description	Access	Format	Type	Bit Position	Description	Type
Input	0	1	Success Flag	Read	U16	Integer			
Input	1	1	Status LED	Read	U16	Integer	0 1 2 3 4 5-15	Ready LED 1 (Green Solid) Batch LED 2 (Green) Alarm LED 3 (Red Flash) Zero or Span Calibration LED 4 (Red Solid) Zero w LED 1 (Green Solid) Not Used	Bool Bool Bool Bool Bool Bool
Input	2	1	Status 1	Read	U16	Integer	0-1 2 3 4 5 6 7 8-12 13 14 15	Not Used Flag Low Speed Flag High Speed Flag Low Rate Flag High Rate Flag Low Load Flag High Load Not Used Calibration Running Cumulative Alarms Active Cumulative Shut Down Active	Bool Bool Bool Bool Bool Bool Bool Bool Bool Bool
Input	3	1	Status 2	Read	U16	Integer	0-3 4-11	See following table Not Used	Bool Bool
Input	4	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
Input	5	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
Input	6	1	Alarms 1	Read	U16	Integer	0 1 2 3 4 5 6	High Rate Low Load Scale # 2 Low Load Scale # 1 Low Load High Load Scale # 2 High Load Scale # 1 High Load	Bool Bool Bool Bool Bool Bool Bool

							7	Speed Sensor Error	Bool
							8	ROM fail	Bool
							9	RAM fail	Bool
							10	Signal Cell Fail Scale # 4	Bool
							11	Signal Cell Fail Scale # 3	Bool
							12	Signal Cell Fail Scale # 2	Bool
							13	Signal Cell Fail Scale # 1	Bool
							14	Signal Cell Fail (Single Scale)	Bool
							15	Clock Fail	Bool
Input	7	1	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
							1	Calibration Time Elapsed (Single Scale)	Bool
							2	Power During Calibration	Bool
							3	Cold Start	Bool
							4	Warm Start	Bool
							5	Low Speed Scale #2	Bool
							6	Low Speed Scale #1	Bool
							7	Low Speed	Bool
							8	High Speed Scale # 2	Bool
							9	High Speed Scale # 1	Bool
							10	High Speed	Bool
							11	Low Rate Scale # 2	Bool
							12	Low Rate Scale # 1	Bool
							13	Low Rate	Bool
							14	High Rate Scale # 2	Bool
							15	High Rate Scale # 1	Bool
Input	8	1	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
							1	HW configuration Changed Slot 2	Bool
							2	HW configuration Changed Slot 1	Bool
							3	Batch Deviation Scale #2	Bool
							4	Batch Deviation Scale #1	Bool
							5	Batch Deviation	Bool

							6	AZT Over Limit Scale #2	Bool
							7	AZT Over Limit Scale #1	Bool
							8	AZT OVER LIMIT	Bool
							9	Overflow Totalizer Scale #2	Bool
							10	Overflow Totalizer Scale #1	Bool
							11	Overflow Totalizer	Bool
							12	External Alarm 3	Bool
							13	External Alarm 2	Bool
							14	External Alarm 1	Bool
							15	Calibration Time Elapsed Scale # 2	Bool
Input	9	1	Alarms 4	Read	U16	Integer	0	Multiple load cell imbalance alarm	Bool
							1	AZT Over Limit Step Scale #2	Bool
							2	AZT Over Limit Step Scale #1	Bool
							3	AZT Over Limit Step	Bool
							4	Zero Limit Scale #2	Bool
							5	Zero Limit Scale #1	Bool
							6	Zero Limit	Bool
							7	ProfiBus Error	Bool
							8	Communication RIO Error	Bool
							9	Communication Error	Bool
							10	Printer Error	Bool
							11	Math Error	Bool
							12	BCD Error	Bool
							13	Not Used	Bool
							14	Audit Trail Wrapped	Bool
							15	HW configuration Changed Slot 4	Bool
Input	10	1	Alarms 5	Read	U16	Integer	0-10	Not Used	Bool
							11	A/D Shutdown Channel 4	Bool
							12	A/D Shutdown Channel 3	Bool
							13	A/D Shutdown Channel 2	Bool
							14	A/D Shutdown Channel 1	Bool

							15	A/D Shutdown	Bool
Input	11	1	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
Input	12	1	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
							1	Input 2 - Digital 8In/8Out Board #1	Bool
							2	Input 3 - Digital 8In/8Out Board #1	Bool
							3	Input 4 - Digital 8In/8Out Board #1	Bool
							4	Input 5 - Digital 8In/8Out Board #1	Bool
							5	Input 6 - Digital 8In/8Out Board #1	Bool
							6	Input 7 - Digital 8In/8Out Board #1	Bool
							7	Input 8 - Digital 8In/8Out Board #1	Bool
							8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
							9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
							10	Input 3 - Digital Input Board	Bool
							11	Input 4 - Digital Input Board	Bool
							12	Input 5 - Digital Input Board	Bool
							13-15	Not Used	Bool
Input	13	1	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
							2	Output 1 - Digital Input Board	Bool
							3	Output 2 - Digital Input Board	Bool
							4	Output 3 - Digital Input Board	Bool
							5	Output 4 - Digital Input Board	Bool
							6-7	Not Used	Bool
							8	Input 1 - Digital 8In/8Out Board #2	Bool
							9	Input 2 - Digital 8In/8Out Board #2	Bool
							10	Input 3 - Digital 8In/8Out Board #2	Bool
							11	Input 4 - Digital 8In/8Out Board #2	Bool
							12	Input 5 - Digital 8In/8Out Board #2	Bool
							13	Input 6 - Digital 8In/8Out Board #2	Bool
							14	Input 7 - Digital 8In/8Out Board #2	Bool
							15	Input 8 - Digital 8In/8Out Board #2	Bool

Input	14	1	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
							1	Output 2 - Digital 8In/8Out Board #2	Bool
							2	Output 3 - Digital 8In/8Out Board #2	Bool
							3	Output 4 - Digital 8In/8Out Board #2	Bool
							4	Output 5 - Digital 8In/8Out Board #2	Bool
							5	Output 6 - Digital 8In/8Out Board #2	Bool
							6	Output 7 - Digital 8In/8Out Board #2	Bool
							7	Output 8 - Digital 8In/8Out Board #2	Bool
							8	Output 1 - Digital 8In/8Out Board #1	Bool
							9	Output 2 - Digital 8In/8Out Board #1	Bool
							10	Output 3 - Digital 8In/8Out Board #1	Bool
							11	Output 4 - Digital 8In/8Out Board #1	Bool
							12	Output 5 - Digital 8In/8Out Board #1	Bool
							13	Output 6 - Digital 8In/8Out Board #1	Bool
							14	Output 7 - Digital 8In/8Out Board #1	Bool
							15	Output 8 - Digital 8In/8Out Board #1	Bool
Input	15	1	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
Input	16	1	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
Input	17	1	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
Input	18	1	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
Input	19	1	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
Input	20	1	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
Input	21	1	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
Input	22	1	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
Input	23	1	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
Input	24	1	Number Of Trials	Read	U16	Integer		** This register is LSB first, not MSB first	
Input	25	1	Model ID	Read	U16	Integer		** This register is LSB first, not MSB first	
Input	26	1	Batch Number	Read	U16	Integer		** This register is LSB first, not MSB first	
Input	27	1	Batch Deviation	Read	U16	Integer		** This register is LSB first, not MSB first	
Input	28	1	AZ Deviation	Read	U32	Long Integer		** This register is LSB first, not MSB first	

Input	30	1	Zero Number	Read	U32	Long Integer		** This register is LSB first, not MSB first	
Input	32	1	Zero Reference	Read	U32	Long Integer		** This register is LSB first, not MSB first	
Input	34	1	Free Space	Read	U16	Integer			
Input	35	1	Free Space	Read	U16	Integer			
Input	36	1	Free Space	Read	U16	Integer			
Input	37	1	Free Space	Read	U16	Integer			
Input	38	1	Free Space	Read	U16	Integer			
Input	39	1	Free Space	Read	U16	Integer			
Input	40	1	Free Space	Read	U16	Integer			
Input	41	1	Free Space	Read	U16	Integer			
Input	42	1	Free Space	Read	U16	Integer			
Input	43	1	Free Space	Read	U16	Integer			
Input	44	1	Span Number	Read	IEEE754 Big-endian	Float			
Input	46	1	Scale Capacity	Read	IEEE754 Big-endian	Float			
Input	48	1	Speed Capacity	Read	IEEE754 Big-endian	Float			
Input	50	1	Load Cell Capacity	Read	IEEE754 Big-endian	Float			
Input	52	1	Rate	Read	IEEE754 Big-endian	Float			
Input	54	1	Load	Read	IEEE754 Big-endian	Float			
Input	56	1	Speed	Read	IEEE754 Big-endian	Float			
Input	58	1	Master Total	Read	IEEE754 Big-endian	Float			
Input	60	1	Reset Total	Read	IEEE754 Big-endian	Float			
Input	62	1	Operator Total	Read	IEEE754 Big-endian	Float			

Input	64	1	Batch Total	Read	IEEE754 Big-endian	Float			
Input	66	1	Batch Setpoint	Read	IEEE754 Big-endian	Float			
Input	68	1	Batch Preset	Read	IEEE754 Big-endian	Float			
Input	70	1	Batch Preact	Read	IEEE754 Big-endian	Float			
Input	72	1	AZT Correction	Read	IEEE754 Big-endian	Float			
Input	74	1	Auto Zero Max Dev	Read	IEEE754 Big-endian	Float			
Input	76	1	Total AZ %	Read	IEEE754 Big-endian	Float			
Input	78	1	AZT step limit	Read	IEEE754 Big-endian	Float			
Input	80	1	Belt Warm	Read	IEEE754 Big-endian	Float			
Input	82	1	High Rate Set	Read	IEEE754 Big-endian	Float			
Input	84	1	Low Rate Set	Read	IEEE754 Big-endian	Float			
Input	86	1	High Speed Set	Read	IEEE754 Big-endian	Float			
Input	88	1	Low Speed Set	Read	IEEE754 Big-endian	Float			
Input	90	1	High Load Set	Read	IEEE754 Big-endian	Float			
Input	92	1	Low Load Set	Read	IEEE754 Big-endian	Float			
Input	94	1	Cal Error	Read	IEEE754 Big-endian	Float			
Input	96	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	98	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	100	1	Free Space	Read	IEEE754 Big-endian	Float			

Input	102	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	104	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	106	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	108	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	110	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	112	1	Free Space	Read	IEEE754 Big-endian	Float			
Input	114	1	Free Space	Read	IEEE754 Big-endian	Float			

Table 43 – Ethernet/IP 9301 Input Table

Register Status 2 (Offset 2) Bit 0-3 Lookup Table		Bit Position			
Description	3	2	1	0	
Batch Not Running	0	0	0	0	
Batch is going To Start	0	0	0	1	
Batch is Running at High Rate	0	0	1	0	
Batch is Running at Low Rate	0	0	1	1	
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0	
Batch is in Coast	0	1	0	1	
Batch Hold (Suspended) at High Rate	1	0	1	0	
Batch Hold (Suspended) at Low Rate	1	0	1	1	
Batch Hold (Suspended) at Coast	1	1	0	1	

Table 44 – Register Status 2 (Offset 2) Bit 0-3 Lookup Table

Output Data Table – The Output data table contains information that is written from the PLC to the 9105.

Instance	Offset	Scale	Description	Access	Format	Type	Bit Position	Description	Type
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Output	0	1	Number Of trials	Write	U16	Integer			
Output	1	1	Command	Write	U32	Long Integer	0-15	Not Used	Bool
							0	Acknowledge Alarms	Bool
							1	Batch Start	Bool
							2	Batch Abort	Bool
							3	Batch Standby	Bool
							4	Remote Acquire new Zero or Span	Bool
							5	Remote start zero	Bool
							6	Remote start weights calibration	Bool
							7	Remote start chain calibration	Bool
							8	Remote start R-Cal	Bool
							9	Reset short-term total	Bool
							10	Reset operator total	Bool
							11-15	Unused	Bool
Output	3	1	Last Key Pressed	Write	U16	Integer			
Output	4	1	Batch Number	Write	U16	Integer			
Output	5	1	Batch Deviation	Write	U16	Integer			
Output	6	1	Free Space	Write	U16	Integer			
Output	7	1	Free Space	Write	U16	Integer			
Output	8	1	Free Space	Write	U16	Integer			
Output	9	1	Free Space	Write	U16	Integer			
Output	10	1	Free Space	Write	U16	Integer			
Output	11	1	Free Space	Write	U16	Integer			
Output	12	1	Free Space	Write	U16	Integer			
Output	13	1	Free Space	Write	U16	Integer			
Output	14	1	Free Space	Write	U16	Integer			
Output	15	1	Free Space	Write	U16	Integer			
Output	16	1	Scale Capacity	Write	IEEE754 Big-endian	Float			
Output	18	1	Speed Capacity	Write	IEEE754 Big-endian	Float			

Output	20	1	Load Cell Capacity	Write	IEEE754 Big-endian	Float			
Output	22	1	Batch Setpoint	Write	IEEE754 Big-endian	Float			
Output	24	1	Batch Preset	Write	IEEE754 Big-endian	Float			
Output	26	1	Batch Preact	Write	IEEE754 Big-endian	Float			
Output	28	1	Auto Zero Max Dev	Write	IEEE754 Big-endian	Float			
Output	30	1	AZT step limit	Write	IEEE754 Big-endian	Float			
Output	32	1	Belt Warm	Write	IEEE754 Big-endian	Float			
Output	34	1	High Rate Set	Write	IEEE754 Big-endian	Float			
Output	36	1	Low Rate Set	Write	IEEE754 Big-endian	Float			
Output	38	1	High Speed Set	Write	IEEE754 Big-endian	Float			
Output	40	1	Low Speed Set	Write	IEEE754 Big-endian	Float			
Output	42	1	High Load Set	Write	IEEE754 Big-endian	Float			
Output	44	1	Low Load Set	Write	IEEE754 Big-endian	Float			
Output	46	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	48	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	50	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	52	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	54	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	56	1	Free Space	Write	IEEE754 Big-endian	Float			

Output	58	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	60	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	62	1	Free Space	Write	IEEE754 Big-endian	Float			
Output	64	1	Free Space	Write	IEEE754 Big-endian	Float			

Table 45 – Ethernet/IP 9301 Output Table



Micro-Tech 9301 Modbus TCP Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9301 are as follows.

- **REC4306** 9301 Integrator Reference Manual– All languages and all revisions.
- **REC4307** 9301 Integrator User Manual– All languages and all revisions.
- **REC4372** 9000 ProfiBus-DP Protocol Manual – All languages and all revisions.

Software Version Information

This version of the Modbus TCP Register has been tested with the only software version available for the 9301 Integrator.

- **144.00.01.00**

Modbus TCP Setup Information

The Modbus TCP Ethernet connection is established over port 502 and does not require a Slave ID to function. Modbus TCP does not need to be turned on in the Micro-Tech controller, just connect an Ethernet cable and set the Address information below.

To enter the Ethernet information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 4” appears in the LCD display.
- Press the softkey button under the **Ether** text on the screen to enter the Ethernet setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - IP Address = XX.XX.XX.XX (User defined).
 - Mask Address = XX.XX.XX.XX (User defined).
 - Gateway Address = XX.XX.XX.XX (User defined).

Modbus TCP Data Read

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

The Micro-Tech 9301 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9301 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9301 will return an error or provide incorrect data.

Modbus TCP Data Write

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9101. This may also cause the 9105 to become non-responsive and require a reboot.

Modbus Register	Scale	Description	Access	Format	Type	Bit Position	Description	Type
40001	1	Success Flag	Read	U16	Integer			
40002-40011	1	Display Line 1 – Total of 20 Characters over the first display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40012-40021	1	Display Line 2 - Total of 20 Characters over the second display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40022-40031	1	Display Line 3 - Total of 20 Characters over the third display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40032-40041	1	Display Line 4 - Total of 20 Characters over the fourth display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40042-40081	1	Display Line 5 - Total of 80 Characters over the fifth display line,	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40082	1	Status LED	Read	U16	Integer	0 1 2 3 4 5-15	Ready LED 1 (Green Solid) Batch LED 2 (Green) Alarm LED 3 (Red Flash) Zero or Span Calibration LED 4 (Red Solid) Zero w LED 1 (Green Solid) Not Used	Bool Bool Bool Bool Bool Bool
40083	1	Status 1	Read	U16	Integer	0-1 2 3	Not Used Flag Low Speed Flag High Speed	Bool Bool Bool

						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
40084	1	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-15	Not Used	Bool
40085	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40086	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40087	1	Alarms 1	Read	U16	Integer	0	High Rate	Bool
						1	Low Load Scale # 2	Bool
						2	Low Load Scale # 1	Bool
						3	Low Load	Bool
						4	High Load Scale # 2	Bool
						5	High Load Scale # 1	Bool
						6	High Load	Bool
						7	Speed Sensor Error	Bool
						8	ROM fail	Bool
						9	RAM fail	Bool
						10	Signal Cell Fail Scale # 4	Bool
						11	Signal Cell Fail Scale # 3	Bool
						12	Signal Cell Fail Scale # 2	Bool
						13	Signal Cell Fail Scale # 1	Bool
						14	Signal Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
40088	1	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool

						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool
						14	High Rate Scale # 2	Bool
						15	High Rate Scale # 1	Bool
40089	1	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool
						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool
						8	AZT OVER LIMIT	Bool
						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool
						12	External Alarm 3	Bool
						13	External Alarm 2	Bool
						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
40090	1	Alarms 4	Read	U16	Integer	0	Multiple load cell imbalance alarm	Bool
						1	AZT Over Limit Step Scale #2	Bool

						2	AZT Over Limit Step Scale #1	Bool
						3	AZT Over Limit Step	Bool
						4	Zero Limit Scale #2	Bool
						5	Zero Limit Scale #1	Bool
						6	Zero Limit	Bool
						7	ProfiBus Error	Bool
						8	Communication RIO Error	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12	BCD Error	Bool
						13	Not Used	Bool
						14	Audit Trail Wrapped	Bool
						15	HW configuration Changed Slot 4	Bool
40091	1	Alarms 5	Read	U16	Integer	0-10	Not Used	Bool
						11	A/D Shutdown Channel 4	Bool
						12	A/D Shutdown Channel 3	Bool
						13	A/D Shutdown Channel 2	Bool
						14	A/D Shutdown Channel 1	Bool
						15	A/D Shutdown	Bool
40092	1	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
40093	1	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool

						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
40094	1	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
40095	1	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool

						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
40096	1	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
40097	1	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
40098	1	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
40099	1	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
40100	1	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
40101	1	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
40102	1	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
40103	1	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
40104	1	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
40105	1	Number Of trials	Read/Write	U16	Integer			
40106	1	Command	Read/Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
						10	Reset operator total	Bool
11-15	Unused	Bool						
40108	1	Last Key Pressed	Read/Write	U16	Integer			

40109	1	Model ID	Read	U16	Integer			
40110	1	Batch Number	Read/Write	U16	Integer			
40111	1	Batch Deviation	Read/Write	U16	Integer			
40112	1	AZ Deviation	Read	U32	Long Integer			
40114	1	Zero Number	Read	U32	Long Integer			
40116	1	Zero Reference	Read	U32	Long Integer			
40118	1	Free Space	Read	U16	Integer			
40119	1	Free Space	Read	U16	Integer			
40120	1	Free Space	Read	U16	Integer			
40121	1	Free Space	Read	U16	Integer			
40122	1	Free Space	Read	U16	Integer			
40123	1	Free Space	Read	U16	Integer			
40124	1	Free Space	Read	U16	Integer			
40125	1	Free Space	Read	U16	Integer			
40126	1	Free Space	Read	U16	Integer			
40127	1	Free Space	Read	U16	Integer			
40128	1	Span Number	Read	IEEE754 Big-endian	Float			
40130	1	Scale Capacity	Read/Write	IEEE754 Big-endian	Float			
40132	1	Speed Capacity	Read	IEEE754 Big-endian	Float			
40134	1	Load Cell Capacity	Read/Write	IEEE754 Big-endian	Float			
40136	1	Rate	Read	IEEE754 Big-endian	Float			
40138	1	Load	Read	IEEE754 Big-endian	Float			
40140	1	Speed	Read	IEEE754 Big-endian	Float			

40142	1	Master Total	Read	IEEE754 Big-endian	Float			
40144	1	Reset Total	Read/ Write	IEEE754 Big-endian	Float			
40146	1	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40148	1	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40150	1	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40152	1	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40154	1	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40156	1	AZT Correction	Read	IEEE754 Big-endian	Float			
40158	1	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40160	1	Total AZ %	Read	IEEE754 Big-endian	Float			
40162	1	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40164	1	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40166	1	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40168	1	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40170	1	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40172	1	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40174	1	High Load Set	Read/ Write	IEEE754 Big-endian	Float			
40176	1	Low Load Set	Read/ Write	IEEE754 Big-endian	Float			
40178	1	Cal Error	Read	IEEE754 Big-endian	Float			

40180	1	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40184	1	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40188	1	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40192	1	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40196	1	Free Space	Read	IEEE754 Big-endian	Float			
40198	1	Free Space	Read	IEEE754 Big-endian	Float			
40200	1	Free Space	Read	IEEE754 Big-endian	Float			
40202	1	Free Space	Read	IEEE754 Big-endian	Float			
40204	1	Free Space	Read	IEEE754 Big-endian	Float			
40206	1	Free Space	Read	IEEE754 Big-endian	Float			
40208	1	Free Space	Read	IEEE754 Big-endian	Float			
40210	1	Free Space	Read	IEEE754 Big-endian	Float			
40212	1	Free Space	Read	IEEE754 Big-endian	Float			
40214	1	Free Space	Read	IEEE754 Big-endian	Float			

Table 46 – Modbus RTU Register Table

Register 40084 Bit 0-3 Lookup Table	Bit Position			
	3	2	1	0
Description				
Batch Not Running	0	0	0	0
Not Used	0	0	0	1
Batch is Running at High Rate	0	0	1	0

Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 47 – Modbus Register Bit 0-3 Lookup Table



Micro-Tech 9301 Modbus RTU Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9301 are as follows.

- **REC4306** 9301 Integrator Reference Manual– All languages and all revisions.
- **REC4307** 9301 Integrator User Manual– All languages and all revisions.
- **REC4372** 9000 ProfiBus-DP Protocol Manual – All languages and all revisions.

Software Version Information

This version of the Modbus RTU Register has been tested with the only software version available for the 9301 Integrator.

- **144.00.01.00**

Modbus RTU HMI Setup Information

The Modbus RTU connection is established over serial RS485 4 wire. Modbus RTU does not need to be turned on in the Micro-Tech controller, just connect the serial cable and set the information below.

To enter the Serial information in the Micro-Tech, do the following.

- Press the softkey **Menu** button until “Main Menu 5” appears in the LCD display.
- Press the softkey button under the **CommA** text on the screen to enter the Serial setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - Baud Rate = XXXX (9600 default, user defined).
 - Parity = XX (No Parity default, user defined).
 - Stop Bits = XX (1 default, user defined).
 - Word Length = XX (8 default, user defined).
 - Protocol = Modbus
 - Address = XX (1 default, user defined).

Modbus RTU Hardware Setup Information

NOTE – RS485 Full Duplex (4 wire) protocol has been successfully verified and tested by Ramsey. RS485 Half Duplex (2 wire) has been tested by Ramsey and does not work reliably on the 9301.

From the factory, the default jumper position is set for RS232, which was used to connect a printer. For Modbus RTU communications, the jumpers need to be set for RS485 Full Duplex (4 wire) as per the following table.

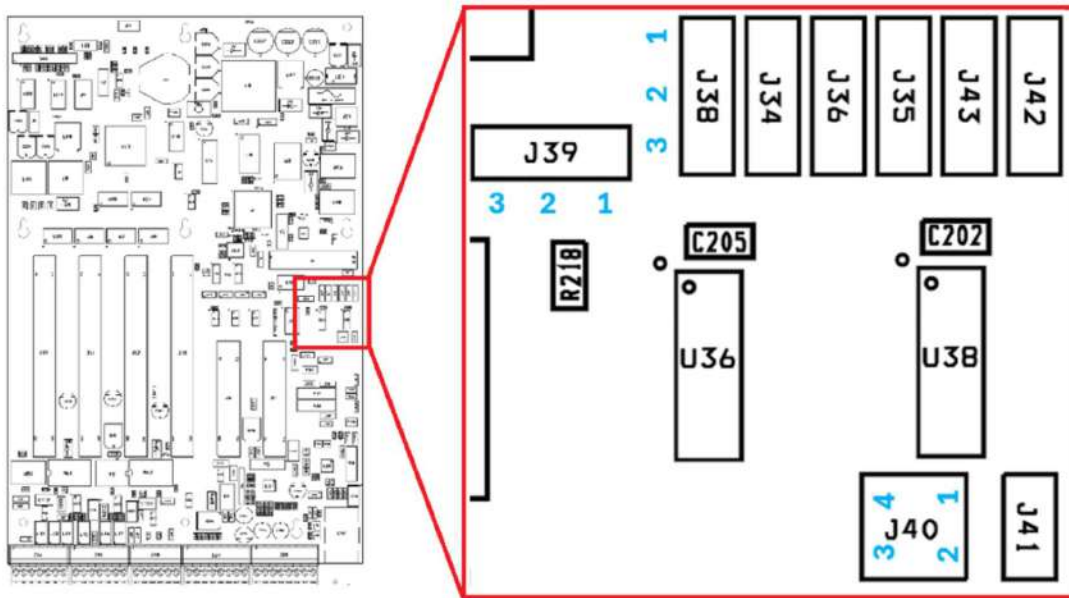


Figure 4 – RS485 4 Wire Jumper Positions

Jumper	J39	J38	J34	J36	J35	J43	J43	J40
RS485 4 Wire – No Termination Resistors	2-3	1-2	1-2	2-3	2-3	1-2	1-2	3-4
RS485 4 Wire – With 120ohm Termination Resistor	2-3	1-2	1-2	2-3	2-3	1-2	1-2	1-2
RS485 4 Wire – With 120ohm Termination Resistor and 600ohm Pull up / Pull Down Bias Resistors	2-3	1-2	1-2	2-3	2-3	2-3	2-3	1-2

Table 48 – RS485 4 Wire Jumper Positions

Modbus RTU Data Read

Reads are limited to **40 x 16 bit registers**, Requests for more registers are considered an error, the request will be ignored and will not generate an answer.

Note that the display read out of the 5th line is not available with Modbus RTU – only with Modbus TCP. Only lines 1, 2, 3 and 4 are transferred over Modbus RTU.

The Micro-Tech 9301 updates the internal registers every 100ms (approximately). Reads of Registers at less than 100ms will receive the same data multiple times. The data sent from the 9301 to the Master is in format of MSB first then LSB second.

Do not start a Modbus register read part way through a Long Integer or Floating value. For example, the parameter Load Cell Capacity starts at 40144.

- Correct Read - Start reading at register 40144.
- Incorrect Read - Start reading at register 40145, 9105 will return an error or provide incorrect data.

Modbus RTU Data Write

Do not write bytes of Long Integer or Floating values separately. For example, the parameter Scale Capacity at 40140 is a 32bit Floating number consisting of two 16bit registers 40140 and 40141.

- Correct Write – Send 2 x bytes (32 bits) to register 40140 with length 2.
- Incorrect Write - Send 1 x byte (16 bits) to register 40140 with length 1 then send 1 x byte (16 bits) to register 40141 with length 1. Information is not accepted by the 9101. This may also cause the 9105 to become non-responsive and require a reboot.

Modbus Register	Scale	Description	Access	Format	Type	Bit Position	Description	Type
40001	Both	Success Flag	Read	U16	Integer			
40002-40021	Both	Display Line 1 – Total of 20 Characters over the first display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40022-40041	Both	Display Line 2 - Total of 20 Characters over the second display line	Read	U16	Integer(s)	0-7 8-15	Each 16bit Modbus register contains 2x 8bit Characters	Char Char
40042-40061	Both	Display Line 3 - Total of 20 Characters over the third display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40062-40081	Both	Display Line 4 - Total of 20 Characters over the fourth display line	Read	U16	Integer(s)	0-7 8-15	Not Used Register contains 1x 8bit Character	Char Char
40082	Both	Status LED	Read	U16	Integer	0 1 2 3 4	Ready LED 1 (Green Solid) Batch LED 2 (Green) Alarm LED 3 (Red Flash) Zero or Span Calibration LED 4 (Red Solid) Zero w LED 1 (Green Solid)	Bool Bool Bool Bool Bool

						5-15	Not Used	Bool						
40083	1	Status 1	Read	U16	Integer	0-1	Not Used	Bool						
						2	Flag Low Speed	Bool						
						3	Flag High Speed	Bool						
						4	Flag Low Rate	Bool						
						5	Flag High Rate	Bool						
						6	Flag Low Load	Bool						
						7	Flag High Load	Bool						
						8-12	Not Used	Bool						
						13	Calibration Running	Bool						
						14	Cumulative Alarms Active	Bool						
						15	Cumulative Shut Down Active	Bool						
						40084	1	Status 2	Read	U16	Integer	0-3	See following table	Bool
												4-15	Not Used	Bool
						40085	1	Status 3	Read	U16	Integer	0-15	Not Used	Bool
						40086	1	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40087	Both	Alarms 1	Read	U16	Integer	0	High Rate	Bool						
						1	Low Load Scale # 2	Bool						
						2	Low Load Scale # 1	Bool						
						3	Low Load	Bool						
						4	High Load Scale # 2	Bool						
						5	High Load Scale # 1	Bool						
						6	High Load	Bool						
						7	Speed Sensor Error	Bool						
						8	ROM fail	Bool						
						9	RAM fail	Bool						
						10	Signal Cell Fail Scale # 4	Bool						
						11	Signal Cell Fail Scale # 3	Bool						
						12	Signal Cell Fail Scale # 2	Bool						
						13	Signal Cell Fail Scale # 1	Bool						
						14	Signal Cell Fail (Single Scale)	Bool						

						15	Clock Fail	Bool
40088	Both	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool
						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool
						14	High Rate Scale # 2	Bool
15	High Rate Scale # 1	Bool						
40089	Both	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool
						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool
						8	AZT OVER LIMIT	Bool
						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool
						12	External Alarm 3	Bool
13	External Alarm 2	Bool						

						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
40090	Both	Alarms 4	Read	U16	Integer	0	Multiple load cell imbalance alarm	Bool
						1	AZT Over Limit Step Scale #2	Bool
						2	AZT Over Limit Step Scale #1	Bool
						3	AZT Over Limit Step	Bool
						4	Zero Limit Scale #2	Bool
						5	Zero Limit Scale #1	Bool
						6	Zero Limit	Bool
						7	ProfiBus Error	Bool
						8	Communication RIO Error	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12	BCD Error	Bool
						13	Not Used	Bool
						14	Audit Trail Wrapped	Bool
						15	HW configuration Changed Slot 4	Bool
40091	Both	Alarms 5	Read	U16	Integer	0-10	Not Used	Bool
						11	A/D Shutdown Channel 4	Bool
						12	A/D Shutdown Channel 3	Bool
						13	A/D Shutdown Channel 2	Bool
						14	A/D Shutdown Channel 1	Bool
						15	A/D Shutdown	Bool
40092	Both	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
40093	Both	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool

						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
40094	Both	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool
						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
40095	Both	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool

						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool
						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
40096	Both	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
40097	Both	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
40098	Both	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
40099	Both	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
40100	Both	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
40101	Both	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
40102	Both	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
40103	Both	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
40104	Both	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
40105	Both	Number Of trials	Read/ Write	U16	Integer			
40106	1	Command	Read/ Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
10	Reset operator total	Bool						

						11-15	Unused	Bool
40108	Both	Last Key Pressed	Read/ Write	U16	Integer			
40109	Both	Model ID	Read	U16	Integer			
40110	1	Batch Number	Read/ Write	U16	Integer			
40111	1	Batch Deviation	Read/ Write	U16	Integer			
40112	1	AZ Deviation	Read	U32	Long Integer			
40114	1	Zero Number	Read	U32	Long Integer			
40116	1	Zero Reference	Read	U32	Long Integer			
40118	1	Free Space	Read	U16	Integer			
40119	1	Free Space	Read	U16	Integer			
40120	1	Free Space	Read	U16	Integer			
40121	1	Free Space	Read	U16	Integer			
40122	1	Free Space	Read	U16	Integer			
40123	1	Free Space	Read	U16	Integer			
40124	1	Free Space	Read	U16	Integer			
40125	1	Free Space	Read	U16	Integer			
40126	1	Free Space	Read	U16	Integer			
40127	1	Free Space	Read	U16	Integer			
40128	1	Span Number	Read	IEEE754 Big-endian	Float			
40130	1	Scale Capacity	Read/ Write	IEEE754 Big-endian	Float			
40132	1	Speed Capacity	Read	IEEE754 Big-endian	Float			
40134	1	Load Cell Capacity	Read/ Write	IEEE754 Big-endian	Float			
40136	1	Rate	Read	IEEE754 Big-endian	Float			

40138	1	Load	Read	IEEE754 Big-endian	Float			
40140	1	Speed	Read	IEEE754 Big-endian	Float			
40142	1	Master Total	Read	IEEE754 Big-endian	Float			
40144	1	Reset Total	Read/ Write	IEEE754 Big-endian	Float			
40146	1	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40148	1	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40150	1	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40152	1	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40154	1	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40156	1	AZT Correction	Read	IEEE754 Big-endian	Float			
40158	1	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40160	1	Total AZ %	Read	IEEE754 Big-endian	Float			
40162	1	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40164	1	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40166	1	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40168	1	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40170	1	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40172	1	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40174	1	High Load Set	Read/ Write	IEEE754 Big-endian	Float			

40176	1	Low Load Set	Read/Write	IEEE754 Big-endian	Float			
40178	1	Cal Error	Read	IEEE754 Big-endian	Float			
40180	1	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40184	1	Reset Total Double	Read	IEEE754 Big-endian	Long Float			
40188	1	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40192	1	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40196	1	Free Space	Read	IEEE754 Big-endian	Float			
40198	1	Free Space	Read	IEEE754 Big-endian	Float			
40200	1	Free Space	Read	IEEE754 Big-endian	Float			
40202	1	Free Space	Read	IEEE754 Big-endian	Float			
40204	1	Free Space	Read	IEEE754 Big-endian	Float			
40206	1	Free Space	Read	IEEE754 Big-endian	Float			
40208	1	Free Space	Read	IEEE754 Big-endian	Float			
40210	1	Free Space	Read	IEEE754 Big-endian	Float			
40212	1	Free Space	Read	IEEE754 Big-endian	Float			
40214	1	Free Space	Read	IEEE754 Big-endian	Float			
40216	2	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool
						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool

						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
40217	2	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-11	Not Used	Bool
						12	High-High Negative Deviation	Bool
						13	High Negative Deviation	Bool
						14	High-High Positive Deviation	Bool
						15	High Positive Deviation	Bool
40218	2	Status 3	Read	U16	Integer	0-15	Not Used	Bool
40219	2	Status 4	Read	U16	Integer	0-15	Not Used	Bool
40220	2	Command	Read/ Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
						8	Remote start R-Cal	Bool
						9	Reset short-term total	Bool
						10	Reset operator total	Bool
11-15	Unused	Bool						
40222	2	Batch Number	Read/ Write	U16	Integer			
40223	2	Batch Deviation	Read/ Write	U16	Integer			

40224	2	AZ Deviation	Read	U32	Long Integer			
40226	2	Zero Number	Read	U32	Long Integer			
40228	2	Zero Reference	Read	U32	Long Integer			
40230	2	Free Space	Read	U16	Integer			
40231	2	Free Space	Read	U16	Integer			
40232	2	Free Space	Read	U16	Integer			
40233	2	Free Space	Read	U16	Integer			
40234	2	Free Space	Read	U16	Integer			
40235	2	Free Space	Read	U16	Integer			
40236	2	Free Space	Read	U16	Integer			
40237	2	Free Space	Read	U16	Integer			
40238	2	Free Space	Read	U16	Integer			
40239	2	Free Space	Read	U16	Integer			
40240	2	Span Number	Read	IEEE754 Big-endian	Float			
40242	2	Scale Capacity	Read/Write	IEEE754 Big-endian	Float			
40244	2	Speed Capacity	Read	IEEE754 Big-endian	Float			
40246	2	Load Cell Capacity	Read/Write	IEEE754 Big-endian	Float			
40248	2	Rate	Read	IEEE754 Big-endian	Float			
40250	2	Load	Read	IEEE754 Big-endian	Float			
40252	2	Speed	Read	IEEE754 Big-endian	Float			
40254	2	Master Total	Read	IEEE754 Big-endian	Float			
40256	2	Reset Total	Read/Write	IEEE754 Big-endian	Float			

40258	2	Operator Total	Read/ Write	IEEE754 Big-endian	Float			
40260	2	Batch Total	Read/ Write	IEEE754 Big-endian	Float			
40262	2	Batch Setpoint	Read/ Write	IEEE754 Big-endian	Float			
40264	2	Batch Preset	Read/ Write	IEEE754 Big-endian	Float			
40266	2	Batch Preact	Read/ Write	IEEE754 Big-endian	Float			
40268	2	AZT Correction	Read	IEEE754 Big-endian	Float			
40270	2	Auto Zero Max Dev	Read/ Write	IEEE754 Big-endian	Float			
40272	2	Total AZ %	Read	IEEE754 Big-endian	Float			
40274	2	AZT step limit	Read/ Write	IEEE754 Big-endian	Float			
40276	2	Belt Warm	Read/ Write	IEEE754 Big-endian	Float			
40278	2	High Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40280	2	Low Rate Set	Read/ Write	IEEE754 Big-endian	Float			
40282	2	High Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40284	2	Low Speed Set	Read/ Write	IEEE754 Big-endian	Float			
40286	2	High Load Set	Read/ Write	IEEE754 Big-endian	Float			
40288	2	Low Load Set	Read/ Write	IEEE754 Big-endian	Float			
40290	2	Cal Error	Read	IEEE754 Big-endian	Float			
40292	2	Master Total Double	Read	IEEE754 Big-endian	Long Float			
40296	2	Reset Total Double	Read	IEEE754 Big-endian	Long Float			

40300	2	Operator Total Double	Read	IEEE754 Big-endian	Long Float			
40304	2	Batch Total Double	Read	IEEE754 Big-endian	Long Float			
40308	2	Free Space	Read	IEEE754 Big-endian	Float			
40310	2	Free Space	Read	IEEE754 Big-endian	Float			
40312	2	Free Space	Read	IEEE754 Big-endian	Float			
40314	2	Free Space	Read	IEEE754 Big-endian	Float			
40316	2	Free Space	Read	IEEE754 Big-endian	Float			
40318	2	Free Space	Read	IEEE754 Big-endian	Float			
40320	2	Free Space	Read	IEEE754 Big-endian	Float			
40322	2	Free Space	Read	IEEE754 Big-endian	Float			
40324	2	Free Space	Read	IEEE754 Big-endian	Float			
40326	2	Free Space	Read	IEEE754 Big-endian	Float			

Table 49 – Modbus RTU Register Table

Register 40084 Bit 0-3 Lookup Table	Bit Position			
Description	3	2	1	0
Batch Not Running	0	0	0	0
Not Used	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1

Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 50 – Modbus Register Bit 0-3 Lookup Table



Micro-Tech 9301 ProfiBus Register Table

Discrepancy to Original Manuals

If any discrepancy is found between the original Thermo Fisher manuals and this section, then this document supersedes that information.

The original Thermo Fisher manuals for the Micro-Tech 9301 are as follows.

- **REC4306** 9301 Integrator Reference Manual– All languages and all revisions.
- **REC4307** 9301 Integrator User Manual– All languages and all revisions.
- **REC4372** 9000 ProfiBus-DP Protocol Manual – All languages and all revisions.

Software Version Information

This version of the ProfiBus Register has been tested with the only software version available for the 9301 Integrator.

- **144.00.01.00**

GSD Version Information

This version of the 9301 software must use the following General Station Description (GSD) file, it is the only version of the ProfiBus GSD file that has been tested with the 9301 software version 144.00.01.00.

- **GSD_9301_144_00_01_00.gsd**

This GSD file is available, please contact your Ramsey distributor. Updating the GSD file on the PLC may require modifications to the connected PLC program if using older software versions of the 9301.

NOTE - GSD files have a maximum character length of 12 when being loaded into Siemens TIA portal, so loading this file will result in an error. The file name will need to be shortened by the user prior to loading into TIA portal. Ramsey use a longer file name for version control and tracking purposes.

ProfiBus Setup Information

ProfiBus is not native to the standard 9301 and requires an additional option card to function (Part number 102936). If ProfiBus is required and your controller does not have this option card installed, then please contact your Ramsey distributor.

ProfiBus **does** need to be turned on in the Micro-Tech controller and the device ID set. To setup ProfiBus do the following.

- With 9301 powered down, install the ProfiBus card (Part number 102936) into any slot with the larger board connectors (Slots U1, U2, U3 or U4). The end DB9 extender will need to be removed to install the ProfiBus card into the slot – do not force it in or it may damage the option card or main PCB. The end DB9 connector will need to be reinstalled after option card installation so the Siemens style ProfiBus DB9 connector will reach the option card DB9 connector.
- Power on the unit. The screen will display “Slot X Changed – Acquire New Configuration?” to which you must press the **Yes** soft key. If you press No, or the screen times out, then the ProfiBus option card is not configured and will not communicate. If either of these happened, then remove the option card, power up, power down then follow the above process again.

- Press the softkey **Menu** button until “Main Menu 5” appears in the LCD display.
- Press the softkey button under the **Profib** text on the screen to enter the ProfiBus setup menus.
- Press the down-arrow button (number **8**) to scroll through the setup pages.
- The following settings can be adjusted.
 - Address = XXX (User defined – must be between 0-126).
 - Read Buffer Dimension = 48 words (User defined – suggest to not modify, range of 5-48).
 - Write Buffer Dimension = 48 words (User defined – suggest to not modify, range of 5-48).
 - Variable Selection = Not Damped, Damped, Displayed.

ProfiBus Data Blocks

In the 9301 ProfiBus data is organized in Registers which are then contained inside Data Blocks. These Data Blocks are shown in the table below. Some Data Blocks are “Read only” (RO) while others are “Write Only” (WO). The Micro-Tech 9301 updates the internal registers every 100ms (approximately). Reads of the Data Block at faster rates than 100ms will receive the same data multiple times. The data sent from the 9301 to the Master is in format of MSB first then LSB second.

Block Type	Identification Number	Description of Data
Read	0	Status, Alarms, I/O, Dynamic data
	1	Batch (Load Out)
	2	Sets and Thresholds
Write	100	Status, Alarms, I/O, Dynamic data
	101	Batch (Load Out)
	102	Sets and Thresholds

Table 51 – ProfiBus Block Information

ProfiBus Read

In the ProfiBus protocol, the Master continuously reads data from the 9301 Read buffer. The 9301 starts to update the Read buffer with the Registers contained in Block 0 immediately from Power On, and will continue to do so until instructed to populate different information into the Read buffer.

To change data in the Read buffer from Block 0 to Block 1, 2 or 3 requires a Write message to be sent from the Master to the 9301.

ID	Offset	Description	Data Type	Bit Position	Description
1	1	Block Identifier	Integer	0	0 = Block 0 1 = Block 1 2 = Block 2 3 = Block 3

		This determines which Data Block gets copied into the Read buffer, and therefore determines what data is being read by the ProfiBus Master.		1-7	Not Used
				8	0 = Scale 1 1 = Scale 2 2 = Scale 3 3 = Scale 4
				9-15	Not Used
2	2	1st Register From within the Data Block requested, what is the first Register that should be read. A value of 0 means the first register onwards will be placed in the Read buffer.	Integer		
3	3	Number of Registers From the first Register specified within the Data Block, how many Registers should be transferred into the Read Buffer. A value of 0 means the entire Data Block is placed into the Buffer.	Integer		
4	4	Stamp To avoid the 9105 interpreting the same Master message over and over again, the 9105 interprets received data only if the stamp value is different from the stamp value received in the previous request. The Master has only to change the stamp value when it creates a new message – in this case a request to change which Data Block to read. The stamp can be any number as long as its different between messages, so a random number or incremental counter value will suffice.	Integer		

Table 52 – Write data to Change Data Block Read

Read Data Block 0 - Block “0” is the Read block that contains all the registers relevant to the Status, Alarms, I/O and Dynamic data. It is the default group the Micro-Tech 9101 sends to the Master for a read request if the Master does not change the requested Data Block.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
0	5	Status LED	Read	U16	Integer	0	Ready LED 1 (Green Solid)	Bool
						1	Batch LED 2 (Green)	Bool
						2	Alarm LED 3 (Red Flash)	Bool
						3	Zero or Span Calibration LED 4 (Red Solid)	Bool
						4	Zero w LED 1 (Green Solid)	Bool
						5	Remote LED 4 (Green Solid)	Bool

						6	Auto LED 2 (Green Solid)	Bool
						7-15	Not Used	Bool
0	6	Status 1	Read	U16	Integer	0-1	Not Used	Bool
						2	Flag Low Speed	Bool
						3	Flag High Speed	Bool
						4	Flag Low Rate	Bool
						5	Flag High Rate	Bool
						6	Flag Low Load	Bool
						7	Flag High Load	Bool
						8-12	Not Used	Bool
						13	Calibration Running	Bool
						14	Cumulative Alarms Active	Bool
						15	Cumulative Shut Down Active	Bool
0	7	Status 2	Read	U16	Integer	0-3	See following table	Bool
						4-11	Not Used	Bool
						12	High-High Negative Deviation	Bool
						13	High Negative Deviation	Bool
						14	High-High Positive Deviation	Bool
						15	High Positive Deviation	Bool
0	8	Status 3	Read	U16	Integer	0-15	Not Used	Bool
0	9	Status 4	Read	U16	Integer	0-15	Not Used	Bool
0	10	Alarms 1	Read	U16	Integer	0	High Rate	Bool
						1	Low Load Scale # 2	Bool
						2	Low Load Scale # 1	Bool
						3	Low Load	Bool
						4	High Load Scale # 2	Bool
						5	High Load Scale # 1	Bool
						6	High Load	Bool
						7	Speed Sensor Error	Bool
						8	ROM fail	Bool
						9	RAM fail	Bool

						10	Signal Cell Fail 4 - (Channel 4)	Bool
						11	Signal Cell Fail 3 - (Channel 3)	Bool
						12	Signal Cell Fail 2 - (Scale 2/Channel 2)	Bool
						13	Signal Cell Fail 1 - (Scale 1/Channel 1)	Bool
						14	Signal Cell Fail (Single Scale)	Bool
						15	Clock Fail	Bool
0	11	Alarms 2	Read	U16	Integer	0	Calibration Time Elapsed Scale # 1	Bool
						1	Calibration Time Elapsed (Single Scale)	Bool
						2	Power During Calibration	Bool
						3	Cold Start	Bool
						4	Warm Start	Bool
						5	Low Speed Scale #2	Bool
						6	Low Speed Scale #1	Bool
						7	Low Speed	Bool
						8	High Speed Scale # 2	Bool
						9	High Speed Scale # 1	Bool
						10	High Speed	Bool
						11	Low Rate Scale # 2	Bool
						12	Low Rate Scale # 1	Bool
						13	Low Rate	Bool
						14	High Rate Scale # 2	Bool
						15	High Rate Scale # 1	Bool
0	12	Alarms 3	Read	U16	Integer	0	HW configuration Changed Slot 3	Bool
						1	HW configuration Changed Slot 2	Bool
						2	HW configuration Changed Slot 1	Bool
						3	Batch Deviation Scale #2	Bool
						4	Batch Deviation Scale #1	Bool
						5	Batch Deviation	Bool
						6	AZT Over Limit Scale #2	Bool
						7	AZT Over Limit Scale #1	Bool
						8	AZT OVER LIMIT	Bool

						9	Overflow Totalizer Scale #2	Bool
						10	Overflow Totalizer Scale #1	Bool
						11	Overflow Totalizer	Bool
						12	External Alarm 3	Bool
						13	External Alarm 2	Bool
						14	External Alarm 1	Bool
						15	Calibration Time Elapsed Scale # 2	Bool
0	13	Alarms 4	Read	U16	Integer	0	High control neg. deviation scale 2	Bool
						1	High high control pos. deviation scale 2	Bool
						2	High control pos. deviation scale 2	Bool
						3	High high control neg. deviation scale 1	Bool
						4	High control neg. deviation scale 1	Bool
						5	High high control pos. deviation scale 1	Bool
						6	High control pos. deviation scale 1	Bool
						7	ProfiBus Error	Bool
						8	Not Used	Bool
						9	Communication Error	Bool
						10	Printer Error	Bool
						11	Math Error	Bool
						12-14	Not Used	Bool
						15	HW configuration Changed Slot 4	Bool
0	14	Alarms 5	Read	U16	Integer	0-2	Not Used	Bool
						3	A/D Shutdown Channel 4	Bool
						4	A/D Shutdown Channel 3	Bool
						5	A/D Shutdown Channel 2	Bool
						6	A/D Shutdown Channel 1	Bool
						7	A/D Shutdown	Bool
						8	Multiple load cell imbalance alarm	Bool
						9	AZT Over Limit Step Scale #2	Bool
						10	AZT Over Limit Step Scale #1	Bool
						11	AZT Over Limit Step	Bool

						12	Zero Limit Scale #2	Bool
						13	Zero Limit Scale #1	Bool
						14	Zero Limit	Bool
						15	High high control neg. deviation Scale 2	Bool
0	15	Alarms 6	Read	U16	Integer	0-15	Not Used	Bool
0	16	I/O 1	Read	U16	Integer	0	Input 1 - Digital 8In/8Out Board #1	Bool
						1	Input 2 - Digital 8In/8Out Board #1	Bool
						2	Input 3 - Digital 8In/8Out Board #1	Bool
						3	Input 4 - Digital 8In/8Out Board #1	Bool
						4	Input 5 - Digital 8In/8Out Board #1	Bool
						5	Input 6 - Digital 8In/8Out Board #1	Bool
						6	Input 7 - Digital 8In/8Out Board #1	Bool
						7	Input 8 - Digital 8In/8Out Board #1	Bool
						8	Input 1 - Digital Input Motherboard (Speed Input 1)	Bool
						9	Input 2 - Digital Input Motherboard (Speed Input 2)	Bool
						10	Input 3 - Digital Input Board	Bool
						11	Input 4 - Digital Input Board	Bool
						12	Input 5 - Digital Input Board	Bool
						13-15	Not Used	Bool
0	17	I/O 2	Read	U16	Integer	0-1	Not Used	Bool
						2	Output 1 - Digital Input Board	Bool
						3	Output 2 - Digital Input Board	Bool
						4	Output 3 - Digital Input Board	Bool
						5	Output 4 - Digital Input Board	Bool
						6-7	Not Used	Bool
						8	Input 1 - Digital 8In/8Out Board #2	Bool
						9	Input 2 - Digital 8In/8Out Board #2	Bool
						10	Input 3 - Digital 8In/8Out Board #2	Bool
						11	Input 4 - Digital 8In/8Out Board #2	Bool
						12	Input 5 - Digital 8In/8Out Board #2	Bool

						13	Input 6 - Digital 8In/8Out Board #2	Bool
						14	Input 7 - Digital 8In/8Out Board #2	Bool
						15	Input 8 - Digital 8In/8Out Board #2	Bool
0	18	I/O 3	Read	U16	Integer	0	Output 1 - Digital 8In/8Out Board #2	Bool
						1	Output 2 - Digital 8In/8Out Board #2	Bool
						2	Output 3 - Digital 8In/8Out Board #2	Bool
						3	Output 4 - Digital 8In/8Out Board #2	Bool
						4	Output 5 - Digital 8In/8Out Board #2	Bool
						5	Output 6 - Digital 8In/8Out Board #2	Bool
						6	Output 7 - Digital 8In/8Out Board #2	Bool
						7	Output 8 - Digital 8In/8Out Board #2	Bool
						8	Output 1 - Digital 8In/8Out Board #1	Bool
						9	Output 2 - Digital 8In/8Out Board #1	Bool
						10	Output 3 - Digital 8In/8Out Board #1	Bool
						11	Output 4 - Digital 8In/8Out Board #1	Bool
						12	Output 5 - Digital 8In/8Out Board #1	Bool
						13	Output 6 - Digital 8In/8Out Board #1	Bool
						14	Output 7 - Digital 8In/8Out Board #1	Bool
						15	Output 8 - Digital 8In/8Out Board #1	Bool
0	19	I/O 4	Read	U16	Integer	0-15	Not Used	Bool
0	20	I/O 5	Read	U16	Integer	0-15	Not Used	Bool
0	21	I/O 6	Read	U16	Integer	0-15	Not Used	Bool
0	22	I/O 7	Read	U16	Integer	0-15	Not Used	Bool
0	23	I/O 8	Read	U16	Integer	0-15	Not Used	Bool
0	24	I/O 9	Read	U16	Integer	0-15	Not Used	Bool
0	25	I/O 10	Read	U16	Integer	0-15	Not Used	Bool
0	26	I/O 11	Read	U16	Integer	0-15	Not Used	Bool
0	27	I/O 12	Read	U16	Integer	0-15	Not Used	Bool
0	28	Model ID	Read	U16	Integer			
0	29	Zero Number	Read	U32	Long Integer			

0	31	Span Number	Read	IEEE754 Big-endian	Float		
0	33	Rate	Read	IEEE754 Big-endian	Float		
0	35	Load	Read	IEEE754 Big-endian	Float		
0	37	Speed	Read	IEEE754 Big-endian	Float		
0	39	Master Total	Read	IEEE754 Big-endian	Float		
0	41	Reset Total	Read	IEEE754 Big-endian	Float		
0	43	Operator Total	Read	IEEE754 Big-endian	Float		
0	45	Cal Error	Read	IEEE754 Big-endian	Float		

Table 53 – 9301 ProfiBus Read Block 0

Block 0 Offset 7 Bit 0-3 Lookup Table	Bit Position			
	3	2	1	0
Batch Not Running	0	0	0	0
Batch is going To Start	0	0	0	1
Batch is Running at High Rate	0	0	1	0
Batch is Running at Low Rate	0	0	1	1
Batch is going To Start (Wait)/Batch Is In Start Delay Time	0	1	0	0
Batch is in Coast	0	1	0	1
Batch Hold (Suspended) at High Rate	1	0	1	0
Batch Hold (Suspended) at Low Rate	1	0	1	1
Batch Hold (Suspended) at Coast	1	1	0	1

Table 54 – Block 0 Offset 7 Bit 0-3 Lookup Table

Read Data Block 1 - Block “1” is the Read block that contains all the registers relevant to the Batch (Load out) function.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
1	5	Batch Number	Read	U16	Integer			
1	6	Batch Deviation	Read	U16	Integer			
1	7	Batch Total	Read	IEEE754 Big-endian	Float			
1	9	Batch Setpoint	Read	IEEE754 Big-endian	Float			
1	11	Batch Preset	Read	IEEE754 Big-endian	Float			
1	13	Batch Preset Setpoint	Read	IEEE754 Big-endian	Float			
1	15	Batch Preact	Read	IEEE754 Big-endian	Float			

Table 55 – 9301 ProfiBus Read Block 1

Read Data Block 2 - Block “2” is the Read block that contains all the registers relevant to Sets and Thresholds.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
2	5	Number of Trials	Read	U16	Integer			
2	6	Zero Reference	Read	U32	Long Integer			
2	8	AZ Deviation	Read	U32	Long Integer			
2	10	Scale Capacity	Read	IEEE754 Big-endian	Float			
2	12	Speed Capacity	Read	IEEE754 Big-endian	Float			
2	14	Load Cell Capacity	Read	IEEE754 Big-endian	Float			
2	16	AZT Correction	Read	IEEE754 Big-endian	Float			
2	18	Auto Zero Max Dev	Read	IEEE754 Big-endian	Float			

2	20	Total AZ %	Read	IEEE754 Big-endian	Float			
2	22	AZT step limit	Read	IEEE754 Big-endian	Float			
2	24	Belt Warm	Read	IEEE754 Big-endian	Float			
2	26	High Rate Set	Read	IEEE754 Big-endian	Float			
2	28	Low Rate Set	Read	IEEE754 Big-endian	Float			
2	30	High Speed Set	Read	IEEE754 Big-endian	Float			
2	32	Low Speed Set	Read	IEEE754 Big-endian	Float			
2	34	High Load Set	Read	IEEE754 Big-endian	Float			
2	36	Low Load Set	Read	IEEE754 Big-endian	Float			

Table 56 – 9301 ProfiBus Read Block 2

Write Data Block 100 - Block “100” is the Write block that is used to drive (set-reset) outputs as well as to send Commands to the Micro-Tech 9105.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
100	5	Command	Write	U32	Long Integer	0-15	Not Used	Bool
						0	Acknowledge Alarms	Bool
						1	Batch Start	Bool
						2	Batch Abort	Bool
						3	Batch Standby	Bool
						4	Remote Acquire new Zero or Span	Bool
						5	Remote start zero	Bool
						6	Remote start weights calibration	Bool
						7	Remote start chain calibration	Bool
8	Remote start R-Cal	Bool						

						9	Reset short-term total	Bool
						10	Reset operator total	Bool
						11-15	Unused	Bool
100	7	Last Key Pressed	Write	U16	Integer			
100	9	Set Digital Output 1	Write	U16	Integer			
100	10	Set Digital Output 2	Write	U16	Integer			
100	11	Set Digital Output 3	Write	U16	Integer			
100	12	Set Digital Output 4	Write	U16	Integer			
100	13	Set Digital Output 5	Write	U16	Integer			

Table 57 – 9301 ProfiBus Write Block 100

Write Data Block 101 - Block “101” is the Write block used to manage the registers relevant to the Batch (Load out) function.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
101	5	Batch Number	Write	U16	Integer			
101	6	Batch Deviation	Write	U16	Integer			
101	7	Batch Setpoint	Write	IEEE754 Big-endian	Float			
101	9	Batch Preset	Write	IEEE754 Big-endian	Float			
101	11	Batch Preact	Write	IEEE754 Big-endian	Float			

Table 58 – 9301 ProfiBus Write Block 101

Write Data Block 102 - Block “102” is the Write block used to manage the registers relevant to Sets and Thresholds.

Block	Offset	Description	Access	Format	Type	Bit Position	Description	Type
102	5	Number of Trials	Write	U16	Integer			
102	6	Scale Capacity	Write	IEEE754 Big-endian	Float			

102	8	Speed Capacity	Write	IEEE754 Big-endian	Float			
102	10	Load Cell Capacity	Write	IEEE754 Big-endian	Float			
102	12	Auto Zero Max Dev	Write	IEEE754 Big-endian	Float			
102	14	AZT step limit	Write	IEEE754 Big-endian	Float			
102	16	Belt Warm	Write	IEEE754 Big-endian	Float			
102	18	High Rate Set	Write	IEEE754 Big-endian	Float			
102	20	Low Rate Set	Write	IEEE754 Big-endian	Float			
102	22	High Speed Set	Write	IEEE754 Big-endian	Float			
102	24	Low Speed Set	Write	IEEE754 Big-endian	Float			
102	26	High Load Set	Write	IEEE754 Big-endian	Float			
102	28	Low Load Set	Write	IEEE754 Big-endian	Float			

Table 59 – 9301 ProfiBus Write Block 102