Modbus Interface for OT805 and OT806 Operator Terminals

Setup and Operating Manual

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System 5100

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Table of Contents

Table of Figures

1 INTRODUCTION

The Modbus Interface option for the OT805 and OT806 operator terminals allows external equipment to get status and readings and to set certain settings for Link equipment. Interface capabilities include:

- OT806 terminals can support Modbus RTU connections on up to four serial ports at the same time. Each serial port has independent settings including baud rate and slave ID. In addition, up to four simultaneous Modbus TCP connections are supported over Ethernet. Although port 502 is standard for Modbus TCP, each socket used for a TCP connection has a settable port number.
- OT805 terminals can support one Modbus RTU connection over a serial port. If the optional communication board is installed, it will also support one Modbus TCP connection over Ethernet. Although port 502 is standard for Modbus TCP, the socket used for the TCP connection has a settable port number.
- Each Modbus RTU connection has a settable reply delay to support gateways or converters.
- Modbus RTU can operate over RS-232 for point to point connections or over RS-422 / RS-485 in 2-wire or 4-wire mode for point to point or bussed connections.
- While additional settings and information will be available on OT805 and OT806 operator terminals, the older OT802 operator terminal register map has been replicated for backwards compatibility with existing interfaces.
- Each Modbus connection, whether serial or Ethernet, has extensive diagnostic counters that show the activity on the connection. This includes the number of messages received, the number of messages sent, exception responses, and more. This allows quick troubleshooting of connections that is especially helpful in a bussed system with multiple devices.
- A Modbus message log shows the actual messages handed by the interface and the response sent. Each message shows the serial port or IP address that has handled it. For serial ports, this amounts to having a built in protocol analyzer for all messages including ones to other devices on the bus. For Ethernet connections, all traffic to and from the operator terminal can be seen. All messages are date and time stamped and the time between messages is also shown to indicate response time. The number of messages that can be contained in the log varies depending upon message length and other factors, but generally at least the last 500 messages will be viewable.

2 DEFINITIONS AND TERMINOLOGY

2.1 Operator Terminals

The Modbus interface is supported by two different operator terminals, the OmniLink 805 Operator Terminal (OT805) shown in Figure 1, and the OmniLink 806 Operator Terminal (OT806) shown in Figure 2. The operation and configuration of the Modbus interface is very similar on both of these terminals as the screen navigation and layout is nearly the same. Where differences exist, these will be spelled out by the model number of the terminal.

In this manual, the "OmniLink805 Operator Terminal" will be referred to as the OT805 and the "OmniLink 806 Operator Terminal" will be referred to as the OT806.

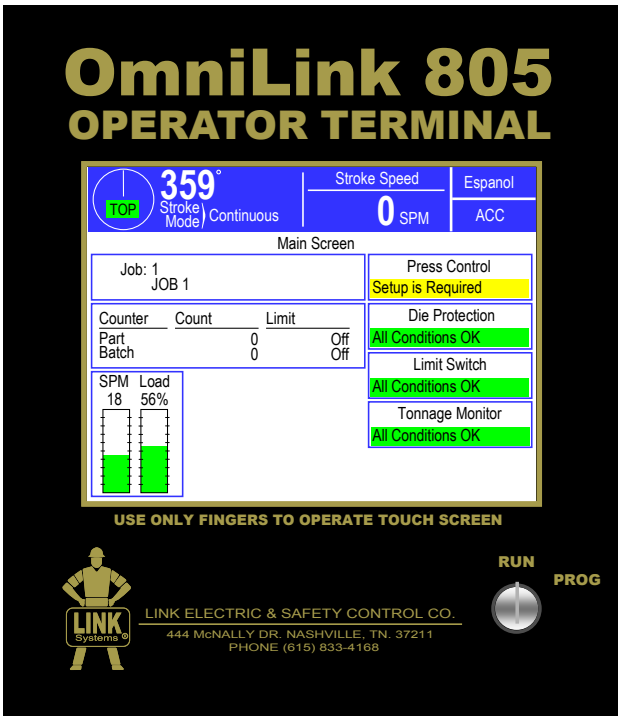

Figure 1: OT805 Operator Terminal

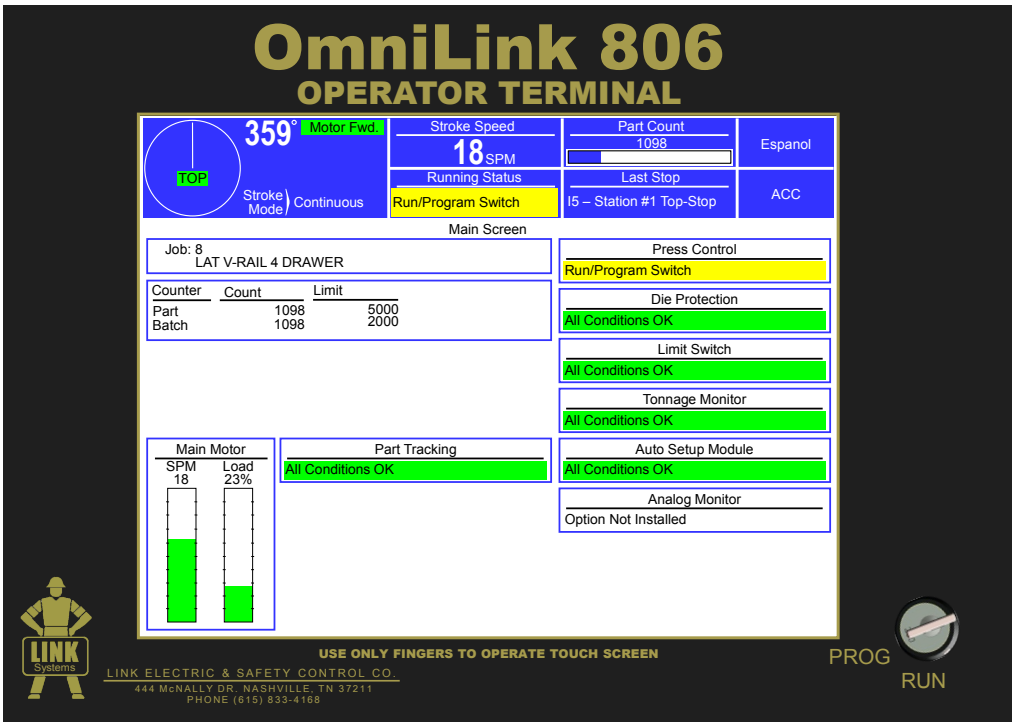

Figure 2: OT806 Operator Terminal

2.2 Hexadecimal Numbers

Some numbers are easier to represent in hexadecimal notation when discussing bits and how they are divided into registers. In addition, a lot of the official Modbus documentation from www.modbus.org uses hexadecimal notation in places. ***In this document, numbers prefixed with "0x" are in hexadecimal notation***. For example, 1234 is in regular decimal notation, while 0x1234 is in hexadecimal notation and would be 4660 decimal.

2.3 Modbus Data Registers

Modbus data is organized around 16-bit input registers (which can only be read, not written) and 16-bit holding registers (which can be read and written). Modbus also has a single bit data type but that is not used in this implementation. Input registers and holding registers each exist in their own address space, and each address space supports up to 65536 items. Section 3.5 documents what data is at each address location for input and holding registers.

2.3.1 Reading Values Larger Than 16 Bits

The largest value supported in a single Modbus register is 16 bits long. This will allow a number from 0 to 65535. Values larger than that must be read from multiple registers.

For numeric values of 32-bits in length, 2 consecutive registers are used. The first register contains the most significant 16 bits of the number, while the second contains the least significant 16 bits. As an example, consider a stroke counter that has a value of 345234. In hexadecimal (where each digit is 4 bits), this number would be 0x00054492. If the stroke count is in register pair 146 and 147, then register 146 would contain 0x0005 and register 147 would contain 0x4492.

A number of status descriptions are available through the interface as well. These are treated as 40 character ASCII "strings" of letters contained in 20 consecutive registers containing 2 characters each. Descriptions shorter than 40 characters are padded with space characters. As an example, the press control "A" current status description can be read from input registers 80 to 99. For the description "Ready to Run", the ASCII characters are:

R	e	a	d	y	_	t	o	_	R	u	n
0x52	0x65	0x61	0x64	0x79	0x20	0x74	0x6F	0x20	0x52	0x75	0x6E

The registers starting at 80 would contain:

0x5265, 0x6164, 0x7920, 0x746F, 0x2052, 0x756E, 0x2020, 0x2020, 0x2020, 0x2020,
0x2020, 0x2020, 0x2020, 0x2020, 0x2020, 0x2020, 0x2020, 0x2020, 0x2020, 0x2020

Note that the only safe way to read a value that is contained in multiple registers is to read all the registers for that value with one command. For instance, do NOT try to read the stroke count by issuing a command to read register 146 and then a separate command to read 147. It is possible that the number could change between one read and the next. When using a command that reads both registers at the same time, the interface guarantees that the value will be correctly transferred as one coherent number. The same situation holds for reading a description. Using separate commands could result in reading the

beginning of one description and the end of a description that changed between commands. ***Always use a single command when reading or writing a multi-register value!***

2.4 Modbus Function Codes

Modbus function codes determine the operation that will take place on the interface. The address space (input register space or holding registers space), whether the operation is a read or a write, or certain other operations are governed by the function code used. Documents covering the complete Modbus protocol can be downloaded from www.modbus.org. The typical function codes that would be used with the OT805 or OT806 are:

- Function Code 0x03 (3 decimal) – Read Holding Registers: Reads from 1 to 125 contiguous registers from the holding register space.
- Function Code 0x04 (4 decimal) – Read Input Registers: Reads from 1 to 125 contiguous registers from the input register space.
- Function Code 0x06 (6 decimal) – Write Single Register: Writes a single register in the holding register space and returns the new value.
- Function Code 0x10 (16 decimal) – Write Multiple Registers: Writes from 1 to 123 contiguous registers in the holding register space.
- Function Code 0x17 (23 decimal) – Read/Write Multiple Registers: Writes from 1 to 121 contiguous registers in the holding register space. In the same operation, it will read from 1 to 125 contiguous registers from the holding register space. Writes occur before the reads.

3 OPERATION

3.1 The Modbus Interface Operator Screen

The operator terminal main screen (See Figure 1 and Figure 2 on page 4) shows the current status of the different options connected to the system. For both the OT805 and the OT806, pressing the **ACC** softkey (near the upper right of the screen) will bring up the "Quick Access" screen. This softkey is available in almost any screen the operator terminal is on (basically as long as you are not already in the "Quick Access" screen or one of the screens accessed from it).

Once in the "Quick Access" screen, press the **Auxiliary Comm** softkey. The "Auxiliary Comm" screen shows all auxiliary communication interfaces that have been configured, including feed interfaces, LinkNet interfaces, and any Modbus interfaces. Each interface has its own box with its name and status. Press inside the box to go to the operation screen for that interface.

NOTE:	The Modbus interface is optional. No Modbus RTU or Modbus TCP interface screen will appear unless the Modbus interface is enabled at the factory or through a Challenge/Response activation method in the field.

Each Modbus RTU interface will have its own box and its own statistics and diagnostic counters. The Modbus TCP interface will be an additional box. Note that a Modbus RTU interface will only appear if enabled and set up on a serial port as described in Section 4.1. The Modbus TCP interface will not appear unless enabled and, in the case of the OT805 operator terminal, unless the optional communication card is installed.

3.2 Modbus RTU Interface Operator Screen

When the inside of a Modbus RTU Interface box shown on the "Auxiliary Comm." screen is touched, a screen with several diagnostic counters will appear. For OT806 terminals, all the diagnostics are shown on one screen. For OT805 terminals, use the **Next Page** and **Previous Page** softkeys to see all the diagnostics.

The diagnostic counters for Modbus RTU are:

Bytes Received	The total number of bytes received on the serial port.
Invalid Data Length	The number of messages received with an invalid data length. Modbus RTU uses a time separation to indicate the boundaries between messages. Whenever more than 256 bytes are received in one continuous stream, this counter will increment.
New Msg Before Old Used	A new message has been received from the serial port before the last one has been processed. This may indicate that the master that is sending the messages does not have a long enough reply timeout set on its end.

Quiet Space Violation	A time delay larger than the data spacing time but shorter than the message boundary time was detected. This is a technical aspect of the Modbus RTU protocol that could indicate noise affecting the line or a problem with the device sending the message.
Character Overrun Count	This is a standard Modbus count that does not apply to the OT805 and OT806 operator terminals. It is displayed because it can be requested as a diagnostic function through the Modbus protocol.
Bus CRC Error Count	The number of messages that the operator terminal has seen on the bus that fail a CRC error check. This can also be messages from other slaves if the bus is a 2-wire RS-485 connection.
Bus Message Count	The total number of valid messages that the operator terminal has seen on the bus.
Broadcast Message Count	The total number of broadcast messages (Slave ID is 0) that the operator terminal has seen on the bus.
Slave Message Count	The number of messages on the bus that have been addressed to this operator terminal.
Slave Exception Count	The number of exception responses sent from this operator terminal back to the master. Exception responses are sent when a command is invalid or cannot be successfully executed.
Slave "No Response" Count	The number of messages to this operator terminal that were not replied to. This can occur because the operator terminal is put into "listen only" mode through the Modbus protocol, or because a broadcast message was received. No reply is ever sent to a broadcast message.
Slave NAK Count	This is a standard Modbus RTU diagnostic count that does not apply to the OT805 and OT806 operator terminals. It is displayed because it can be requested as a diagnostic function through the Modbus protocol.
Slave Busy Count	This is a standard Modbus RTU diagnostic count that does not apply to the OT805 and OT806 operator terminals. It is displayed because it can be requested as a diagnostic function through the Modbus protocol.
Modbus Event Count	This is a standard Modbus RTU counter that is driven through the Modbus protocol and is used in certain specialized cases. See the Modbus protocol definition from www.modbus.org for specifics.
Other Device Message Count	The number of message seen by the operator terminal on the bus to or from other slave devices.

Other Device Exception Count The number of exception responses sent from other slave devices.

The **Reset** softkey will set all the counters back to 0.

The **Message Log** softkey will display the Modbus message log screen. See Section 3.4 for information on the message log.

3.3 Modbus TCP Interface Operator Screen

When the inside of the Modbus TCP Interface box shown on the "Auxiliary Comm." screen is touched, a screen with several diagnostic counters will appear. For OT806 terminals, four boxes are shown with the information from all four possible connections. For OT805 terminals, the information from the single connection is shown. In addition to the diagnostic counters, a status is displayed that shows the status of the TCP socket used for communications. When not connected, it will show the port that the socket is listening on. When connected, it shows the IP address of the master device it is connected to.

The diagnostic counters for Modbus RTU are:

Bytes Received The total number of bytes received on the socket.

Invalid Data Length The number of messages received with an invalid data length

Socket Connect Count The number of times a connection has been made to the socket.

Socket Close Count The number of times the socket connection has been closed.

Socket Abort Count The number of times the socket connection has been aborted.

Message Count The total number of valid messages that the operator terminal has been sent on the socket.

Exception Count The number of exception responses sent from this operator terminal back to the master. Exception responses are sent when a command is invalid or cannot be successfully executed.

The **Reset** softkey will set all the counters back to 0.

The **Message Log** softkey will display the Modbus message log screen. See Section 3.4 for information on the message log.

3.4 Modbus Message Log

The Modbus message log displays Modbus events and complete Modbus messages in a date and time stamped format. All Modbus interfaces report to the same message log. Each log entry from Modbus RTU will show which serial port the message came from (or is sent to). Each log entry from Modbus TCP will show the IP address of the connected device. All Modbus messages tell what function code was used as well as the parameters used with that code and show the complete message. Additional status information will also appear in the message log, showing such things as the reason for exception responses, Ethernet connection status, and so on. An example log might look like the following:

Entry Num.	Entry
1	08/11 19:22:59 [3.9 sec] MBSE_Proc_Soc_Ctx: MBus Soc 0 is listening on Port 502
2	08/11 19:22:59 [0.1 ms] MBSE_Proc_Soc_Ctx: MBus Soc 1 is listening on Port 502
3	08/11 19:22:59 [0.1 ms] MBSE_Proc_Soc_Ctx: MBus Soc 2 is listening on Port 502
4	08/11 19:22:59 [0.2 ms] MBSE_Proc_Soc_Ctx: MBus Soc 3 is listening on Port 502
5	08/11 19:23:16 [16.6 sec] MBSE_TCP_cback: CONREQ on MBus Soc 0 from 190.1.1.134
6	08/11 19:23:16 [1.1 ms] MBSE_TCP_cback: Connect on MBus Soc 0 from 190.1.1.134
7	08/11 19:23:16 [99.6 ms] MODBUS: Recv Soc=0 IP=190.1.1.134, UID=1, TID=0 FCode: 0x03 Read Holding Regs [Addr=1510, Cnt=30] 00 00 00 00 00 06 01 03 05 E6 00 1E
8	08/11 19:23:16 [1.4 ms] MODBUS: Xmit Soc=0 IP=190.1.1.134, UID=1, TID=0 FCode: 0x03 Read Holding Regs [RetCnt=30] 00 00 00 00 00 3F 01 03 3C [2] [0] [0] [270] [90] [1000] [0] [0] [0] [1] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] [0]
9	08/11 19:23:39 [23.2 sec] MODBUS: Recv Soc=0 IP=190.1.1.134, UID=1, TID=1 FCode: 0x06 Write Single Reg [Addr=1518, Val=1] 00 01 00 00 00 06 01 06 05 EE 00 01
10	08/11 19:23:39 [0.1 ms] MBSP_Regs_Write: Reg 1518 write to MSW
11	08/11 19:23:39 [0.7 ms] MODBUS: Exception Soc=0 IP=190.1.1.134, UID=1, TID=1 FCode: 0x86 Write Single Reg Exception (Illegal Function) 00 01 00 00 00 03 01 86 01
12	08/11 19:24:24 [45.1 sec] MBSE_TCP_cback: Close on MBus Soc 0 from 190.1.1.134
13	08/11 19:24:24 [0.6 ms] MBSE_Proc_Soc_Ctx: MBus Soc 0 no longer connected on Port 502 (SS=8)
14	08/11 19:24:24 [3.3 ms] MBSE_Proc_Soc_Ctx: MBus Soc 0 Closing…
15	08/11 19:24:24 [120.4 ms] MBSE_Proc_Soc_Ctx: MBus Soc 0 is listening on Port 502

Note that what appears on the screen is under "Entry". The "Entry Num." is for reference in the following explanation.

Entries 1 – 4 show that on August 11th at 19:22:59 (7:22:59PM), 4 sockets were listening on port 502, the standard Modbus TCP port number. The time in brackets after the date and time of day is the elapsed time from the last log entry to the current log entry.

Entry 5 shows that a connection request came in from a device at IP address 190.1.1.134, and Entry 6 shows that the connection was established.

Entry 7 shows that 99.6 milliseconds after the connection was established, that the master sent a "Read Holding Registers" command, which is function code 0x03. The UID and TID numbers are the "Unit ID" and "Transaction ID". The starting register for the request was 1510 and the command asked to read 30 registers (so the response will return the values in registers 1510 through 1539). The bottom line of Entry 7 shows the raw data from the command in hexadecimal format.

Entry 8 shows that the response was sent back 1.4 milliseconds later to IP address 190.1.1.134 and sent back 30 registers. The 3rd line of Entry 8 shows the raw data of the response beginning in hexadecimal format. ***The rest of the numbers in square brackets on the 3rd and 4th lines are the register values in decimal, not hexadecimal, format.*** The first number in square brackets, [2], is the value of register 1510, the second number in square brackets is the value of register 1511, and so on.

Entry 9 shows that 23.2 seconds later a Function Code 0x06 command (write a single register) arrived with a requested write of "1" to register number 1518.

Entry 10 shows that an attempt was made to write to only the most significant word of a multi-word register value, which is not allowed (see Section 2.3.1 for information on multi-word values).

Entry 11 shows that 0.7 milliseconds later, an "Illegal Function" exception response was sent in response to the command on Entry 9.

Entry 12 indicates a request to close the connection came in from 190.1.1.134, and Entries 13 through 15 shows the socket closing and then returning to a listening state, ready for the next connection.

Most of the time, the entries function code description and decoded register values will provide any necessary diagnostic information. However, the documents available at www.modbus.org contain complete descriptions of the Modbus protocol for each function code should it prove necessary to dig deeper.

There are a number of softkeys in the message log screen to navigate the log:

Clear Log	Clears out the log. New entries will appear as they are added.
First Page	Goes to the first page of the log. These are the oldest entries.
Last Page	Goes to the last page of the log. These are the newest entries.
Previous Page	Goes to the previous page (older entries).
Next Page	Goes to the next page (newer entries).

Start Follow
Stop Follow

This softkey will toggle between **Start Follow** and **Stop Follow**. When in follow mode, the screen will update to automatically show the newest entry as it is added.

Disable Logging
Enable Logging

This softkey will toggle between **Disable Logging** and **Enable Logging**. When logging is disabled, new entries will not be added to the log. This allows freezing the log so that entries under study will not "roll out" of the log as new entries are added.

3.5 Modbus Register Map

The following sections detail the register map for the input register space and the holding register space.

3.5.1 Input Register Map

Input registers are read only and are accessed using Modbus function code 0x04. Note that the "Rev" column is used to indicate at which map revision the parameter became supported. Modbus address 0 can be read to see what revision Modbus map the operator terminal is using. This allows master devices to verify what parameters are supported on operator terminals of different ages. When new parameters are added to the Modbus map, the revision is incremented. Note that OT805 and OT806 terminals are starting out with revision 1.08 so that the revision system will match up with the older OT802 operator terminal.

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
0	The **Revision** of the Modbus map used. This can be used to determine what information is available as functionality is added	General	All
1	The **Month** as reported by the OIT real time clock	General	All
2	The **Day** as reported by the OIT real time clock	General	All
3	The **Year** as reported by the OIT real time clock	General	All
4	The **Hour** as reported by the OIT real time clock	General	All
5	The **Minute** as reported by the OIT real time clock	General	All
6	The **Second** as reported by the OIT real time clock	General	All
7	Reserved		
8	**Crank Angle** in Degrees X 100 (implied 2 decimal places) - 30 degrees would be 3000, 125.34 degrees would be 12534 etc.	General	All
9	**Crank Angle** in 16 bit Binary Resolver format with 2 least significant bits zero. The conversion to degrees is "(Value * 360) / 65536". 90 degrees would be 16384, 123 degrees would be 22388 etc.	General	All
10	**Flywheel Rotation Speed** in RPM. This may only be available on some systems where the drive speed can be read.	General	All
11	**Crankshaft Rotation Speed** in RPM.	General	All
12	Reserved	General	All
13	**Motor Running Flag**. Non-Zero if motor is running.	General	All
14	**Clutch/Brake Flag**. Non-Zero when clutch is engaged	Press Control	All
15	**LMC State Flag**. 0 means LMC is disengaged, 1 means LMC is engaged.	General	All
16	**Auxiliary Equipment Message Selector**. This comes from the opto-isolated parallel port on the back of the OT806.	General	All

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
17	**Press Stroking Mode**. 0 = Off 1 = Inch 2 = Single Stroke 3 = Auto Single Stroke 4 = Continuous 5 = Timed Inch 6 = Setup/Stop Time Test 7 = Cont. on Demand 8 = Maintained Cont. 9 = Reserved 10 = Reserved 11 = Local Inch 12 = Local Single Stroke 13 = Rem. Micro-Inch 14 = Rem. Inch 15 = Rem. Single Stroke 16 = Remote Continuous 17 = Local Micro Inch 18 = Die Change 19 = Clutch/Brake Test	Press Control	All
18	**Mode Select** key switch state. Non-zero if mode select switch is in the "mode select" position.	Press Control	All
19	**Run/Program** key switch state. 0 in the RUN position, Non-zero in the PROG position.	General	All
20 - 24	Reserved	General	All
25	The **Stop Time Limit** (in milliseconds) for stops at the **top** of the stroke.	Press Control	All
26	The **Stop Time Limit** (in milliseconds) for stops **not at the top** of the stroke.	Press Control	All
27	The **Start Time Limit** (in milliseconds) for engaging the clutch.	Press Control	All
28	**Press Control "A" Last Stop Time** (in milliseconds)	Press Control	All
29	**Press Control "A" Last Stop Position**. 1 means a stop on top, 0 means a stop not on top.	Press Control	All
30	**Press Control "A" Last Start Time** (in milliseconds)	Press Control	All
31	**Press Control "B" Last Stop Time** (in milliseconds)	Press Control	All
32	**Press Control "B" Last Stop Position**. 1 means a stop on top, 0 means a stop not on top.	Press Control	All
33	**Press Control "B" Last Start Time** (in milliseconds)	Press Control	All
34	**Running Status.** 0 if press is running, or "Reason for the Last Stop" code if not. 0xFFFF is "Power Up"	General	1.15
35	Reserved	General	All
36	**Press Control "A" Current Status Code**	Press Control	All
37	**Press Control "B" Current Status Code**	Press Control	All
38	**Press Control "A" Reason for Last Stop Code**	Press Control	All

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
39	**Press Control "B" Reason for Last Stop Code**	Press Control	All
40 - 59	**Press Control "A" Reason for Last Stop Description**	Press Control	All
60 - 79	**Press Control "B" Reason for Last Stop Description**	Press Control	All
80 - 99	**Press Control "A" Current Status Description**	Press Control	All
100 - 119	**Press Control "B" Current Status Description**	Press Control	All
120 - 122	Reserved	General	All
123 - 124	**Current Job Number**. These 2 words should be requested in a single message.	General	All
125 - 144	**Current Job Description**. These 20 words should be requested in a single message.	General	All
145	Reserved	General	All
146 - 147	**Stroke Counter Value**. These 2 words should typically be requested in a single message.	General	All
148 - 149	**Scrap Counter Value**. These 2 words should typically be requested in a single message.	General	All
150 - 151	**Counter 1 Value**. These 2 words should typically be requested in a single message.	General	All
152 - 153	**Counter 2 Value**. These 2 words should typically be requested in a single message.	General	All
154 - 155	**Counter 3 Value**. These 2 words should typically be requested in a single message.	General	All
156 - 157	**Counter 4 Value**. These 2 words should typically be requested in a single message.	General	All
158 - 159	**Counter 5 Value**. These 2 words should typically be requested in a single message.	General	All
160 - 161	**Counter 6 Value**. These 2 words should typically be requested in a single message.	General	All
162 - 163	**Counter 7 Value**. These 2 words should typically be requested in a single message.	General	All
164 - 165	**Counter 8 Value**. These 2 words should typically be requested in a single message.	General	All
166 - 167	**Counter 9 Value**. These 2 words should typically be requested in a single message.	General	All
168 - 169	**Counter 10 Value**. These 2 words should typically be requested in a single message.	General	All
170 - 171	**Counter 1 Limit**. These 2 words should typically be requested in a single message.	General	All

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
172 - 173	**Counter 2 Limit**. These 2 words should typically be requested in a single message.	General	All
174 - 175	**Counter 3 Limit**. These 2 words should typically be requested in a single message.	General	All
176 - 177	**Counter 4 Limit**. These 2 words should typically be requested in a single message.	General	All
178 - 179	**Counter 5 Limit**. These 2 words should typically be requested in a single message.	General	All
180 - 181	**Counter 6 Limit**. These 2 words should typically be requested in a single message.	General	All
182 - 183	**Counter 7 Limit**. These 2 words should typically be requested in a single message.	General	All
184 - 185	**Counter 8 Limit**. These 2 words should typically be requested in a single message.	General	All
186 - 187	**Counter 9 Limit**. These 2 words should typically be requested in a single message.	General	All
188 - 189	**Counter 10 Limit**. These 2 words should typically be requested in a single message.	General	All
190	**Counter 1 State**. 0 = Off 1 = On 2 = Tripped	General	All
191	**Counter 2 State**. (See address 190 for details)	General	All
192	**Counter 3 State**. (See address 190 for details)	General	All
193	**Counter 4 State**. (See address 190 for details)	General	All
194	**Counter 5 State**. (See address 190 for details)	General	All
195	**Counter 6 State**. (See address 190 for details)	General	All
196	**Counter 7 State**. (See address 190 for details)	General	All
197	**Counter 8 State**. (See address 190 for details)	General	All
198	**Counter 9 State**. (See address 190 for details)	General	All
199	**Counter 10 State**. (See address 190 for details)	General	All
200 - 209	Reserved	General	All
210	**Tonnage Monitor Enabled Flag**. Non-Zero if tonnage monitor option is enabled	Tonnage Monitor	All
211	**Tonnage Monitor General Status**. This is the same as Address 1038, but also placed here for convenience in reading the overall status of the Tonnage Monitor system in one command. See Address 1035 for values.	Tonnage Monitor	All
212	The **Machine Rating** of the press. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
213	**The Number of Channels in the Tonnage Monitor**.	Tonnage Monitor	All

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
214	**Tonnage Monitor Decimal Point Flag**. If non-zero, then all tonnage values and the machine rating should be interpreted as having 1 decimal place. For example, a tonnage value of 1007 would be 100.7 tons if this flag is non-zero, or 1007 tons if this flag is zero.	Tonnage Monitor	All
215	**Tonnage Monitor Reverse Limit Bypassed Flag**. 0 means reverse limits are NOT bypassed – non-zero is bypassed.	Tonnage Monitor	All
216	**Tonnage Monitor Low Limit Bypassed Flag**. 0 means low limits are NOT bypassed – non-zero is bypassed.	Tonnage Monitor	All
217	**Tonnage Monitor Bypass Flag**. 0 means the tonnage monitor is NOT bypassed – non-zero is bypassed.	Tonnage Monitor	All
218 - 219	Reserved	General	All
220	**Tonnage Monitor Peak Forward Tonnage for Channel 1**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
221	**Tonnage Monitor Peak Forward Tonnage for Channel 2**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
222	**Tonnage Monitor Peak Forward Tonnage for Channel 3**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
223	**Tonnage Monitor Peak Forward Tonnage for Channel 4**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
224	**Tonnage Monitor Peak Total Forward Tonnage for Channels 1 - 4**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
225	**Tonnage Monitor Peak Reverse Tonnage for Channel 1**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
226	**Tonnage Monitor Peak Reverse Tonnage for Channel 2**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
227	**Tonnage Monitor Peak Reverse Tonnage for Channel 3**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
228	**Tonnage Monitor Peak Reverse Tonnage for Channel 4**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
229	**Tonnage Monitor Peak Reverse Total Tonnage for Channels 1 - 4**. The decimal point flag (Address 214) applies to this value.	Tonnage Monitor	All
230	**Tonnage Monitor Channel 1 Status**. Meaning is as follows: 0 = OK 1 = Machine Rating 2 = Reverse Rating 3 = Zero Error 4 = Low Peak Alarm 5 = Low DW1 Alarm 6 = Low DW2 Alarm 7 = Low DW3 Alarm 8 = Low DW4 Alarm 9 = High Peak Alarm 10 = High DW1 Alarm 11 = High DW2 Alarm 12 = High DW3 Alarm 13 = High DW4 Alarm 14 = Reverse Alarm 15 = Reverse DW1 Alarm 16 = Reverse DW2 Alarm 17 = Reverse DW3 Alarm 18 = Reverse DW4 Alarm	Tonnage Monitor	All

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
231	**Tonnage Monitor Channel 2 Status**. See address 230 for details	Tonnage Monitor	All
232	**Tonnage Monitor Channel 3 Status**. See address 230 for details	Tonnage Monitor	All
233	**Tonnage Monitor Channel 4 Status**. See address 230 for details	Tonnage Monitor	All
234 - 289	Reserved	General	All
290	**Number of Auto Setup Modules Enabled**	Auto Set	1.09
291	**Auto-Setup System General Status** This is the same as Address 1037, but also placed here for convenience in reading the overall status of the Auto-Setup system in one command. See Address 1035 for values.	Auto Set	1.09
292	**Slide Adjust Switch State** 0 = Slide Adjust Switch NOT Active 1 = Slide Adjust Switch ACTIVE Note that for systems with more than one slide, power on either slide will cause this value to read as "1".	Auto Set	1.09
293	**Shutheight System 1 Mode** 0 = Off 1 = On 2 = Manual 4 = Not Configured	Auto Set	1.09
294	**Shutheight System 2 Mode** See Address 293 for values.	Auto Set	1.09
295	**Counterbalance System 1 Mode** See Address 293 for values.	Auto Set	1.09
296	**Counterbalance System 2 Mode** See Address 293 for values.	Auto Set	1.09
297	**Hydraulic Overload System 1 Mode** See Address 293 for values.	Auto Set	1.09
298	**Hydraulic Overload System 2 Mode** See Address 293 for values.	Auto Set	1.09
299	**Cushion System 1 Mode** See Address 293 for values.	Auto Set	1.09
300	**Cushion System 2 Mode** See Address 293 for values.	Auto Set	1.09
301	**Cushion System 3 Mode** See Address 293 for values.	Auto Set	1.09
302	**Cushion System 4 Mode** See Address 293 for values.	Auto Set	1.09
303	**Cushion System 5 Mode** See Address 293 for values.	Auto Set	1.09

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
304	**Cushion System 6 Mode** See Address 293 for values.	Auto Set	1.09
305	**Cushion System 7 Mode** See Address 293 for values.	Auto Set	1.09
306	**Cushion System 8 Mode** See Address 293 for values.	Auto Set	1.09
307	**Cushion System 9 Mode** See Address 293 for values.	Auto Set	1.09
308	**Cushion System 10 Mode** See Address 293 for values.	Auto Set	1.09
309	**Cushion System 11 Mode** See Address 293 for values.	Auto Set	1.09
310	**Cushion System 12 Mode** See Address 293 for values.	Auto Set	1.09
311	**Cushion System 13 Mode** See Address 293 for values.	Auto Set	1.09
312	**Cushion System 14 Mode** See Address 293 for values.	Auto Set	1.09
313	**Cushion System 15 Mode** See Address 293 for values.	Auto Set	1.09
314	**Cushion System 16 Mode** See Address 293 for values.	Auto Set	1.09
315	**Cushion Stroke System 1 Mode** See Address 293 for values.	Auto Set	1.09
316	**Cushion Stroke System 2 Mode** See Address 293 for values.	Auto Set	1.09
317	**Cushion Stroke Adjust Switch State** 0 = Cushion Stroke Adjust Switch NOT Active 1 = Cushion Stroke Adjust Switch ACTIVE Note that for systems with more than one cushion stroke system, power on either cushion adjust system will cause this value to read as "1".	Auto Set	1.10
318	**Cushion Stroke 1 Auto-move Status (5100 Auto Set Only)** 0 = Need Cushion Stroke Adjust Switch 1 = Not in Auto-move 2 = Auto-move in progress	Auto Set	1.10
319	**Cushion Stroke 2 Auto-move Status (5100 Auto Set Only)** See 322 for meaning	Auto Set	1.10
320 – 321	**Cushion Stroke 1 Current position** (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be requested in a single message.	Auto Set	1.10

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
322 – 323	**Cushion Stroke 2 Current position** (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be requested in a single message.	Auto Set	1.10
324	**Shut height 1 Auto-move Status (5100 Auto Set Only)** 0 = Need Slide Adjust Switch 1 = Not in Auto-move 2 = Auto-move in progress	Auto Set	1.08
325	**Shut height 2 Auto-move Status (5100 Auto Set Only)** See 324 for meaning	Auto Set	1.08
326 - 327	**Shut height 1 Current position** (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be requested in a single message.	Auto Set	1.06
328 - 329	**Shut height 2 Current position** (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be requested in a single message.	Auto Set	1.06
330	**Counter-Balance 1 Current pressure** (in psi)	Auto Set	1.06
331	**Counter-Balance 2 Current pressure** (in psi)	Auto Set	1.06
332	**Hyd. Overload 1 Current pressure** (in psi)	Auto Set	1.06
333	**Hyd. Overload 2 Current pressure** (in psi)	Auto Set	1.06
334	**Cushion 1 Current Pressure** (in psi)	Auto Set	1.06
335	**Cushion 2 Current Pressure** (in psi)	Auto Set	1.06
336	**Cushion 3 Current Pressure** (in psi)	Auto Set	1.06
337	**Cushion 4 Current Pressure** (in psi)	Auto Set	1.06
338	**Cushion 5 Current Pressure** (in psi)	Auto Set	1.06
339	**Cushion 6 Current Pressure** (in psi)	Auto Set	1.06
340	**Cushion 7 Current Pressure** (in psi)	Auto Set	1.06
341	**Cushion 8 Current Pressure** (in psi)	Auto Set	1.06
342	**Cushion 9 Current Pressure** (in psi)	Auto Set	1.06
343	**Cushion 10 Current Pressure** (in psi)	Auto Set	1.06
344	**Cushion 11 Current Pressure** (in psi)	Auto Set	1.06
345	**Cushion 12 Current Pressure** (in psi)	Auto Set	1.06
346	**Cushion 13 Current Pressure** (in psi)	Auto Set	1.06
347	**Cushion 14 Current Pressure** (in psi)	Auto Set	1.06
348	**Cushion 15 Current Pressure** (in psi)	Auto Set	1.06
349	**Cushion 16 Current Pressure** (in psi)	Auto Set	1.06
350	Reserved	General	All
352 - 353	**Feed Length** (in .01 mm). A value of 10000 is 100.00 mm etc. These 2 words should be requested in a single message.	Feed	All
354 - 355	**Feed Speed**. Units are feed dependent. These 2 words should be requested in a single message.	Feed	All
356 - 357	**Feed Acceleration**. Units are feed dependent. These 2 words should be requested in a single message.	Feed	All

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
358 - 359	**Feed 2nd Axis Offset** (in .01 mm). These 2 words should be requested in a single message.	Feed	All
360 - 379	**Feed Status Line 1 Description**. These 20 words should be requested in a single message.	Feed	All
380 - 399	**Feed Status Line 2 Description**. These 20 words should be requested in a single message.	Feed	All
400 - 419	**Feed Aux. Info Line 1 Description**. These 20 words should be requested in a single message.	Feed	All
420 - 439	**Feed Aux. Info Line 2 Description**. These 20 words should be requested in a single message.	Feed	All
440 - 459	**Feed Aux. Info Line 3 Description**. These 20 words should be requested in a single message.	Feed	All
460 - 479	**Feed Aux. Info Line 4 Description**. These 20 words should be requested in a single message.	Feed	All
480 - 499	**Feed Aux. Info Line 5 Description**. These 20 words should be requested in a single message.	Feed	1.06
500 - 519	**Feed Aux. Info Line 6 Description**. These 20 words should be requested in a single message.	Feed	1.06
520 - 539	**Feed Aux. Info Line 7 Description**. These 20 words should be requested in a single message.	Feed	1.06
540 - 559	**Feed Aux. Info Line 8 Description**. These 20 words should be requested in a single message.	Feed	1.06
560-579	Reserved		
580	**Die Protection System General Status** This is the same as Address 1036, but also placed here for convenience in reading the overall status of the Die Protection system in one command. See Address 1035 for values.	Die Protection	1.09
581	**Die Protection Bypass Flag**. 0 means the tonnage monitor is NOT bypassed – non-zero is bypassed.	Die Protection	1.09
582	**Die Protection Module 1 Channel Bypass Word** Indicates the manual bypass state of each channel. Channel 1 is bit 0 in this word, channel 16 is bit 15 in this word. A "1" in the bit position for the channel indicates the channel is manually bypassed. If this register is non-zero, then at least one channel is bypassed. *This value applies to the 5000 card rack die protection or to the built in die protection channels of the OT805 operator terminal or to Module 1 of the 512X die protection, whichever is installed.*	Die Protection	1.09
583	**Die Protection Module 2 Channel Bypass Word** Indicates the manual bypass state of each channel in module 2 of the 512X die protection module. See Address 582 for meaning.	Die Protection	1.09
584	**Die Protection Module 3 Channel Bypass Word** Indicates the manual bypass state of each channel in module 3 of the 512X die protection module. See Address 582 for meaning.	Die Protection	1.09

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
585	**Die Protection Module 4 Channel Bypass Word** Indicates the manual bypass state of each channel in module 4 of the 512X die protection module. See Address 582 for meaning.	Die Protection	1.09
586	**Die Protection Module 5 Channel Bypass Word** Indicates the manual bypass state of each channel in module 5 of the 512X die protection module. See Address 582 for meaning.	Die Protection	1.09
587	**Ton Mon Die Protection Channel Bypass Word** Indicates the manual bypass state of each channel in the optional 4 die protection channels of the 5100-8 tonnage monitor. See Address 582 for meaning.	Die Protection	1.09
588	**Die Protection Module 1 Channel Input Word** This word contains the On/Off state of the die protection inputs. Channel 1 is bit 0 in this word, and channel 16 is bit 15 in this word.	Die Protection	1.14
589	**Die Protection Module 2 Channel Input Word** This word contains the On/Off state of the die protection inputs. See address 588 for meaning.	Die Protection	1.14
590-619	Reserved		
620	**Programmable Limit Switch System General Status** This is the same as Address 1035, but also placed here for convenience in reading the overall status of the PLS system in one command. See Address 1035 for values.	PLS	1.09
621	**5000 Press Control Programmable Limit Switch Channel Bypass Word** Indicates the manual bypass state of each channel. Channel 1 is bit 0 in this word, channel 16 is bit 15 in this word. A "1" in the bit position for the channel indicates the channel is manually bypassed. If this register is non-zero, then at least one channel is bypassed. This value applies to the 5000 card rack programmable limit switch.	PLS	1.09
622-1023	Reserved		
1024	**Number of Press Controls Enabled.** Can be used to verify that the proper number of modules are enabled as a check that the system configuration has not been altered.	Press Control	1.09
1025	**Number of Automation Controls Enabled.** Can be used to verify that the proper number of modules are enabled as a check that the system configuration has not been altered.	Automation Control	1.09
1026	**Number of Programmable Limit Switch (PLS) Modules Enabled.** Can be used to verify that the proper number of modules are enabled as a check that the system configuration has not been altered.	PLS	1.09

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
1027	**Number of Die Protection Modules Enabled.** Can be used to verify that the proper number of modules are enabled as a check that the system configuration has not been altered.	Die Protection	1.09
1028	**Number of Auto Setup Modules Enabled.** Can be used to verify that the proper number of modules are enabled as a check that the system configuration has not been altered.	Auto Set	1.09
1029	**Number of Tonnage Monitor Modules Enabled.** Can be used to verify that the proper number of modules are enabled as a check that the system configuration has not been altered.	Tonnage Monitor	1.09
1030-1034	Reserved		
1035	**PLS System General Status** 0 = OK 1 = Communication Failure 2 = Manually Bypassed 3 = Error Condition Exists 4 = Option is Not Installed	PLS	1.09
1036	**Die Protection System General Status** See Address 1035 for Values	Die Protection	1.09
1037	**Auto Setup System General Status** See Address 1035 for Values	Auto Set	1.09
1038	**Tonnage Monitor System General Status** See Address 1035 for Values	Tonnage Monitor	1.09
1039-1042	Reserved		
1043	**5000 Press Control Enabled.** 0 = Not Enabled, 1 = Enabled	Press Control	1.09
1044	**5100 Press Control Enabled.** 0 = Not Enabled, 1 = Enabled	Press Control	1.09
1045	Reserved		
1046	**5100 Automation Control Enabled.** 0 = Not Enabled, 1 = Enabled	Automation Control	1.09
1047	Reserved		
1048	**5000 Press Control Programmable Limit Switch 1-8 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1049	**5000 Press Control Programmable Limit Switch 9-16 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1050	**5100 Press Control Programmable Limit Switch 1-4 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1051	**5100 Press Control Programmable Limit Switch 5-8 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1052	**5100-8 Ton. Mon. Programmable Limit Switch 1-4 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
1053	**5100 Programmable Limit Switch 1-8 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1054	**5100 Programmable Limit Switch 9-16 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1055	**5100 Programmable Limit Switch 17-24 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1056	**5100 Programmable Limit Switch 25-32 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1057	**5100 Programmable Limit Switch 33-40 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1058	**5100 Programmable Limit Switch 41-48 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1059	**5100 Programmable Limit Switch 49-56 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1060	**5100 Programmable Limit Switch 57-64 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1061	**5100 Programmable Limit Switch 65-72 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1062	**5100 Programmable Limit Switch 73-80 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1063	**5100 Programmable Limit Switch 81-88 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1064	**5100 Programmable Limit Switch 89-96 Enabled.** 0 = Not Enabled, 1 = Enabled	PLS	1.09
1065-1068	Reserved		
1069	**5000 Press Control Die Protection 1-16 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09
1070	**5100-8 Ton. Mon. Die Protection 1-4 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09
1071	**OT805 Die Protection 1-4 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09
1072	**512X Die Protection Module 1 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09
1073	**512X Die Protection Module 2 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09
1074	**512X Die Protection Module 3 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09
1075	**512X Die Protection Module 4 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09
1076	**512X Die Protection Module 5 Enabled.** 0 = Not Enabled, 1 = Enabled	Die Protection	1.09

Modbus "Input Register" Map Read Only through Function Code 0x04			
Address	**Meaning**	**System**	**Rev**
1077-1080	Reserved		
1081	**5000 Press Control Auto Setup Module Enabled.** 0 = Not Enabled, 1 = Enabled	Auto Set	1.09
1082	**5100 Auto Setup Module 1 Enabled.** 0 = Not Enabled, 1 = Enabled	Auto Set	1.09
1083	**5100 Auto Setup Module 2 Enabled.** 0 = Not Enabled, 1 = Enabled	Auto Set	1.09
1084	**5100 Auto Setup Module 3 Enabled.** 0 = Not Enabled, 1 = Enabled	Auto Set	1.09
1085	**5100 Auto Setup Module 4 Enabled.** 0 = Not Enabled, 1 = Enabled	Auto Set	1.09
1086-1087	Reserved		
1088	**5000 Press Control Tonnage Monitor Enabled.** 0 = Not Enabled, 1 = Enabled	Tonnage Monitor	1.09
1089	**OT805 Tonnage Monitor Enabled.** 0 = Not Enabled, 1 = Enabled	Tonnage Monitor	1.09
1090	**5100-8 Tonnage Monitor Enabled.** 0 = Not Enabled, 1 = Enabled	Tonnage Monitor	1.09

3.5.2 Holding Register Map

Holding registers generally can be read and written and are accessed using Modbus function codes 0x03 (Read), 0x06 (Write Single), 0x10 (Write Multiple), and 0x17 (Write and Read Multiple). Some registers in this space may be "read only" to make it more convenient to get information in one command. Where this is true it will be indicated. A write to a "read only" register will not generate an error but will have no effect. Note that the "Rev" column is used to indicate at which map revision the parameter became supported. Modbus address 0 in the Input Register space can be read to see what revision Modbus map the operator terminal is using. This allows master devices to verify what parameters are supported on operator terminals of different ages. When new parameters are added to the Modbus map, the revision is incremented. Note that OT805 and OT806 terminals are starting out with revision 1.08 so that the revision system will match up with the older OT802 operator terminal.

> **NOTE:** Registers can always be read, ***but nearly all writes to registers require the press to be stopped***. Exceptions to this will be indicated in the text. An exception response will be generated if the press is running when a write occurs to a register that requires the press to be stopped. "Input Register" 14 (Clutch / Brake Flag), can be checked to determine if the press is running.

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
0 - 1	**Job Number** A read from these two locations will give the current job number. A write to address 1 will allow the selection of job numbers 1 to 65536. A write to both address 0 and 1 (using function code 0x10) will allow the selection of any job number. A single write to address 0 is not allowed and will return an exception code. Note that it may take several seconds before the response to this command is sent if "Delay Write Reply Until Data Updated" is set to "Yes" for the interface used. Also note that when writing to the "Job Number" registers, no other registers may be written to in the same command.	General	1.01
2 - 3	Reserved		
4	Reserved		
5	**Current Down Time Code** – This can be read to determine the current down time code. If written to, the value written will become the new down time code. A DTC of 0 clears the DTC. ***This can be written even when the press is running.***	LinkNet	1.02

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
6	**Continuous on Demand Time** – The length of time (in minutes) the press will wait for the continuous on demand run input before requiring re-initialization of the mode.	Press Control	1.03
7	**Initiate Slide Auto-Move** to current setpoint – Writing a 1 to this register will initiate a slide auto-move of shut-height system 1, writing a 2 will initiate a slide auto-move of shut-height system 2, and writing a 3 will initiate a slide auto-move of both of the shut-height systems.	Auto Set	1.07
8	**Initiate Cushion Stroke Auto-Move** to current setpoint – Writing a 1 to this register will initiate an auto-move of cushion-stroke system 1, writing a 2 will initiate an auto-move of cushion-stroke system 2, and writing a 3 will initiate an auto-move of both of the cushion-stroke systems.	Auto Set	1.10
9	Reserved		
10 - 19	Reserved		
20 - 21	**Shut height 1 Setpoint** - (5100 Auto Set Only) (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be sent or requested in a single message.	Auto Set	1.08
22 - 23	**Shut height 2 Setpoint** - (5100 Auto Set Only) (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be sent or requested in a single message.	Auto Set	1.08
24 – 25	**Cushion Stroke 1 Setpoint** - (5100 Auto Set Only) (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be sent or requested in a single message.	Auto Set	1.10
26 – 27	**Cushion Stroke 2 Setpoint** - (5100 Auto Set Only) (in .01mm) A value of 12345 is 123.45 mm etc. These 2 words should be sent or requested in a single message.	Auto Set	1.10
28 – 31	Reserved		
32	**Counter-Balance 1 Pressure Setpoint in PSI.**	Auto Set	1.10
33	**Counter-Balance 2 Pressure Setpoint in PSI.**	Auto Set	1.10
34	**Cushion 1 Pressure Setpoint in PSI.**	Auto Set	1.10
35	**Cushion 2 Pressure Setpoint in PSI.**	Auto Set	1.10
36	**Cushion 3 Pressure Setpoint in PSI.**	Auto Set	1.10
37	**Cushion 4 Pressure Setpoint in PSI.**	Auto Set	1.10
38	**Cushion 5 Pressure Setpoint in PSI.**	Auto Set	1.10
39	**Cushion 6 Pressure Setpoint in PSI.**	Auto Set	1.10
40	**Cushion 7 Pressure Setpoint in PSI.**	Auto Set	1.10
41	**Cushion 8 Pressure Setpoint in PSI.**	Auto Set	1.10
42	**Cushion 9 Pressure Setpoint in PSI.**	Auto Set	1.10
43	**Cushion 10 Pressure Setpoint in PSI.**	Auto Set	1.10
44	**Cushion 11 Pressure Setpoint in PSI.**	Auto Set	1.10
45	**Cushion 12 Pressure Setpoint in PSI.**	Auto Set	1.10
46	**Cushion 13 Pressure Setpoint in PSI.**	Auto Set	1.10

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
47	**Cushion 14 Pressure Setpoint in PSI.**	Auto Set	1.10
48	**Cushion 15 Pressure Setpoint in PSI.**	Auto Set	1.10
49	**Cushion 16 Pressure Setpoint in PSI.**	Auto Set	1.10
50	**Hydraulic Overload 1 Pressure Setpoint in PSI.**	Auto Set	1.10
51	**Hydraulic Overload 2 Pressure Setpoint in PSI.**	Auto Set	1.10
52 – 55	Reserved		
56 - 57	**Counter-Balance 1 Force Setpoint in Pounds.**	Auto Set	1.10
58 – 59	**Counter-Balance 2 Force Setpoint in Pounds.**	Auto Set	1.10
60 – 61	**Cushion 1 Force Setpoint in Pounds.**	Auto Set	1.10
62 – 63	**Cushion 2 Force Setpoint in Pounds.**	Auto Set	1.10
64 – 65	**Cushion 3 Force Setpoint in Pounds.**	Auto Set	1.10
66 – 67	**Cushion 4 Force Setpoint in Pounds.**	Auto Set	1.10
68 – 69	**Cushion 5 Force Setpoint in Pounds.**	Auto Set	1.10
70 – 71	**Cushion 6 Force Setpoint in Pounds.**	Auto Set	1.10
72 – 73	**Cushion 7 Force Setpoint in Pounds.**	Auto Set	1.10
74 – 75	**Cushion 8 Force Setpoint in Pounds.**	Auto Set	1.10
76 – 77	**Cushion 9 Force Setpoint in Pounds.**	Auto Set	1.10
78 – 79	**Cushion 10 Force Setpoint in Pounds.**	Auto Set	1.10
80 – 81	**Cushion 11 Force Setpoint in Pounds.**	Auto Set	1.10
82 – 83	**Cushion 12 Force Setpoint in Pounds.**	Auto Set	1.10
84 – 85	**Cushion 13 Force Setpoint in Pounds.**	Auto Set	1.10
86 – 87	**Cushion 14 Force Setpoint in Pounds.**	Auto Set	1.10
88 – 89	**Cushion 15 Force Setpoint in Pounds.**	Auto Set	1.10
90 – 91	**Cushion 16 Force Setpoint in Pounds.**	Auto Set	1.10
92 – 93	**Hydraulic Overload 1 Force Setpoint in Pounds.**	Auto Set	1.10
94 – 95	**Hydraulic Overload 2 Force Setpoint in Pounds.**	Auto Set	1.10
96 – 99	Reserved		

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
100	**Quality Counter State** - Note that this register acts differently depending on whether it is read from or written to. Reading returns the state of the counter. Writing executes certain commands for the counter. When Read: 0 = Counter Off 1 = Counter On 2 = Counter is Tripped When Written: 11 = Turn Counter On 12 = Turn Counter Off 13 = Toggle Counter On/Off 14 = Reset Counter 15 = Increment Scrap Counter 1 16 = Decrement Scrap Counter 1 17 = Reset Scrap Counter 1 All others = No Effect	Counters	1.10
101	**Quality Counter Percent Complete** - 0 to 100 percent based on count versus limit. This is a read-only value.	Counters	1.10
102 - 103	**Quality Counter Value**. These 2 words should typically be requested in a single message.	Counters	1.10
104 - 105	**Quality Counter Limit**. These 2 words should typically be requested in a single message.	Counters	1.10
106	**Counter Group 1 Part Count State.** Note that this register acts differently depending on whether it is read from or written to. Reading returns the state of the counter. Writing executes certain commands for the counter. When Read: 0 = Counter Off 1 = Counter On 2 = Counter is Tripped When Written: 11 = Turn Counter On 12 = Turn Counter Off 13 = Toggle Counter On/Off 14 = Reset Counter 15 = Increment Counter Group 1 Scrap Count 16 = Decrement Counter Group 1 Scrap Count 17 = Reset Counter Group 1 Scrap Count All Others = No Effect	Counters	1.10

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
107	**Counter Group 1 Part Count Percent Complete.** 0 to 100 percent based on count versus limit. This is a read-only value.	Counters	1.10
108 – 109	**Counter Group 1 Part Count Value**. These 2 words should typically be requested in a single message.	Counters	1.10
110 - 111	**Counter Group 1 Part Count Limit**. These 2 words should typically be requested in a single message.	Counters	1.10
112	**Counter Group 1 Batch Count State** – Same as Address 106 but applies to Counter Group 1 Batch Count.	Counters	1.10
113	**Counter Group 1 Batch Count Percent Complete** - 0 to 100 percent based on count versus limit. This is a read-only value.	Counters	1.10
114 – 115	**Counter Group 1 Batch Count Value**. These 2 words should typically be requested in a single message.	Counters	1.10
116 - 117	**Counter Group 1 Batch Count Limit**. These 2 words should typically be requested in a single message.	Counters	1.10
118 – 119	**Counter Group 1 Scrap Count Value**. These 2 words should typically be requested in a single message.	Counters	1.10
120 – 121	**Counter Group 1 Scrap Count PPM**. These 2 words should typically be requested in a single message. This is as the "parts per million" scrap rate (or alternatively the scrap rate percentage to 4 decimal places. A value of 12345 is 12345 PPM or 1.2345%). This is a read-only value.	Counters	1.10
122	**Counter Group 2 Part Count State.** See Address 106 for usage.	Counters	1.10
123	**Counter Group 2 Part Count Percent Complete.** Read-only.	Counters	1.10
124 – 125	**Counter Group 2 Part Count Value**.	Counters	1.10
126 – 127	**Counter Group 2 Part Count Limit**.	Counters	1.10
128	**Counter Group 2 Batch Count State.** See Address 106 for usage.	Counters	1.10
129	**Counter Group 2 Batch Count Percent Complete.** Read Only.	Counters	1.10
130 – 131	**Counter Group 2 Batch Count Value**.	Counters	1.10
132 – 133	**Counter Group 2 Batch Count Limit**.	Counters	1.10
134 – 135	**Counter Group 2 Scrap Count Value**.	Counters	1.10
136 – 137	**Counter Group 2 Scrap Count PPM**. Read Only.	Counters	1.10
138	**Counter Group 3 Part Count State.** See Address 106 for usage.	Counters	1.10
139	**Counter Group 3 Part Count Percent Complete.** Read-only.	Counters	1.10
140 – 141	**Counter Group 3 Part Count Value**.	Counters	1.10
142 – 143	**Counter Group 3 Part Count Limit**.	Counters	1.10
144	**Counter Group 3 Batch Count State.** See Address 106 for usage.	Counters	1.10
145	**Counter Group 3 Batch Count Percent Complete.** Read Only.	Counters	1.10
146 – 147	**Counter Group 3 Batch Count Value**.	Counters	1.10
148 – 149	**Counter Group 3 Batch Count Limit**.	Counters	1.10
150 – 151	**Counter Group 3 Scrap Count Value**.	Counters	1.10

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
152 – 153	**Counter Group 3 Scrap Count PPM**. Read Only.	Counters	1.10
154	**Counter Group 4 Part Count State.** See Address 106 for usage.	Counters	1.10
155	**Counter Group 4 Part Count Percent Complete.** Read-only.	Counters	1.10
156 – 157	**Counter Group 4 Part Count Value**.	Counters	1.10
158 – 159	**Counter Group 4 Part Count Limit**.	Counters	1.10
160	**Counter Group 4 Batch Count State.** See Address 106 for usage.	Counters	1.10
161	**Counter Group 4 Batch Count Percent Complete.** Read Only.	Counters	1.10
162 – 163	**Counter Group 4 Batch Count Value**.	Counters	1.10
164 – 165	**Counter Group 4 Batch Count Limit**.	Counters	1.10
166 – 167	**Counter Group 4 Scrap Count Value**.	Counters	1.10
168 – 169	**Counter Group 4 Scrap Count PPM**. Read Only.	Counters	1.10
170	**Counter Group 5 Part Count State.** See Address 106 for usage.	Counters	1.10
171	**Counter Group 5 Part Count Percent Complete.** Read-only.	Counters	1.10
172 – 173	**Counter Group 5 Part Count Value**.	Counters	1.10
174 – 175	**Counter Group 5 Part Count Limit**.	Counters	1.10
176	**Counter Group 5 Batch Count State.** See Address 106 for usage.	Counters	1.10
177	**Counter Group 5 Batch Count Percent Complete.** Read Only.	Counters	1.10
178 – 179	**Counter Group 5 Batch Count Value**.	Counters	1.10
180 – 181	**Counter Group 5 Batch Count Limit**.	Counters	1.10
182 – 183	**Counter Group 5 Scrap Count Value**.	Counters	1.10
184 – 185	**Counter Group 5 Scrap Count PPM**. Read Only.	Counters	1.10
186	**Counter Group 6 Part Count State.** See Address 106 for usage.	Counters	1.10
187	**Counter Group 6 Part Count Percent Complete.** Read-only.	Counters	1.10
188 – 189	**Counter Group 6 Part Count Value**.	Counters	1.10
190 – 191	**Counter Group 6 Part Count Limit**.	Counters	1.10
192	**Counter Group 6 Batch Count State.** See Address 106 for usage.	Counters	1.10
193	**Counter Group 6 Batch Count Percent Complete.** Read Only.	Counters	1.10
194 – 195	**Counter Group 6 Batch Count Value**.	Counters	1.10
196 – 197	**Counter Group 6 Batch Count Limit**.	Counters	1.10
198 – 199	**Counter Group 6 Scrap Count Value**.	Counters	1.10
200 – 201	**Counter Group 6 Scrap Count PPM**. Read Only.	Counters	1.10
202	**Counter Group 7 Part Count State.** See Address 106 for usage.	Counters	1.10
203	**Counter Group 7 Part Count Percent Complete.** Read-only.	Counters	1.10
204 – 205	**Counter Group 7 Part Count Value**.	Counters	1.10
206 – 207	**Counter Group 7 Part Count Limit**.	Counters	1.10
208	**Counter Group 7 Batch Count State.** See Address 106 for usage.	Counters	1.10
209	**Counter Group 7 Batch Count Percent Complete.** Read Only.	Counters	1.10

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
210 – 211	**Counter Group 7 Batch Count Value**.	Counters	1.10
212 – 213	**Counter Group 7 Batch Count Limit**.	Counters	1.10
214 – 215	**Counter Group 7 Scrap Count Value**.	Counters	1.10
216 – 217	**Counter Group 7 Scrap Count PPM**. Read Only.	Counters	1.10
218	**Counter Group 8 Part Count State.** See Address 106 for usage.	Counters	1.10
219	**Counter Group 8 Part Count Percent Complete.** Read-only.	Counters	1.10
220 – 221	**Counter Group 8 Part Count Value**.	Counters	1.10
222 – 223	**Counter Group 8 Part Count Limit**.	Counters	1.10
224	**Counter Group 8 Batch Count State.** See Address 106 for usage.	Counters	1.10
225	**Counter Group 8 Batch Count Percent Complete.** Read Only.	Counters	1.10
226 – 227	**Counter Group 8 Batch Count Value**.	Counters	1.10
228 – 229	**Counter Group 8 Batch Count Limit**.	Counters	1.10
230 – 231	**Counter Group 8 Scrap Count Value**.	Counters	1.10
232 – 233	**Counter Group 8 Scrap Count PPM**. Read Only.	Counters	1.10
234	**Counter Group 9 Part Count State.** See Address 106 for usage.	Counters	1.10
235	**Counter Group 9 Part Count Percent Complete.** Read-only.	Counters	1.10
236 – 237	**Counter Group 9 Part Count Value**.	Counters	1.10
238 – 239	**Counter Group 9 Part Count Limit**.	Counters	1.10
240	**Counter Group 9 Batch Count State.** See Address 106 for usage.	Counters	1.10
241	**Counter Group 9 Batch Count Percent Complete.** Read Only.	Counters	1.10
242 – 243	**Counter Group 9 Batch Count Value**.	Counters	1.10
244 – 245	**Counter Group 9 Batch Count Limit**.	Counters	1.10
246 – 247	**Counter Group 9 Scrap Count Value**.	Counters	1.10
248 – 249	**Counter Group 9 Scrap Count PPM**. Read Only.	Counters	1.10
250	**Counter Group 10 Part Count State.** See Address 106 for usage.	Counters	1.10
251	**Counter Group 10 Part Count Percent Complete.** Read-only.	Counters	1.10
252 – 253	**Counter Group 10 Part Count Value**.	Counters	1.10
254 – 255	**Counter Group 10 Part Count Limit**.	Counters	1.10
256	**Counter Group 10 Batch Count State.** See Address 106 for usage.	Counters	1.10
257	**Counter Group 10 Batch Count Percent Complete.** Read Only.	Counters	1.10
258 – 259	**Counter Group 10 Batch Count Value**.	Counters	1.10
260 – 261	**Counter Group 10 Batch Count Limit**.	Counters	1.10
262 – 263	**Counter Group 10 Scrap Count Value**.	Counters	1.10
264 – 265	**Counter Group 10 Scrap Count PPM**. Read Only.	Counters	1.10
266	**Counter Group 11 Part Count State.** See Address 106 for usage.	Counters	1.10

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
267	**Counter Group 11 Part Count Percent Complete.** Read-only.	Counters	1.10
268 – 269	**Counter Group 11 Part Count Value**.	Counters	1.10
270 – 271	**Counter Group 11 Part Count Limit**.	Counters	1.10
272	**Counter Group 11 Batch Count State.** See Address 106 for usage.	Counters	1.10
273	**Counter Group 11 Batch Count Percent Complete.** Read Only.	Counters	1.10
274 – 275	**Counter Group 11 Batch Count Value**.	Counters	1.10
276 – 277	**Counter Group 11 Batch Count Limit**.	Counters	1.10
278 – 279	**Counter Group 11 Scrap Count Value**.	Counters	1.10
280 – 281	**Counter Group 11 Scrap Count PPM**. Read Only.	Counters	1.10
282	**Counter Group 12 Part Count State.** See Address 106 for usage.	Counters	1.10
283	**Counter Group 12 Part Count Percent Complete.** Read-only.	Counters	1.10
284 – 285	**Counter Group 12 Part Count Value**.	Counters	1.10
286 – 287	**Counter Group 12 Part Count Limit**.	Counters	1.10
288	**Counter Group 12 Batch Count State.** See Address 106 for usage.	Counters	1.10
289	**Counter Group 12 Batch Count Percent Complete.** Read Only.	Counters	1.10
290 – 291	**Counter Group 12 Batch Count Value**.	Counters	1.10
292 – 293	**Counter Group 12 Batch Count Limit**.	Counters	1.10
294 – 295	**Counter Group 12 Scrap Count Value**.	Counters	1.10
296 – 297	**Counter Group 12 Scrap Count PPM**. Read Only.	Counters	1.10
298	**Counter Group 1 Type.** 0 = Counter Group Not Used 1 = Stroke Based Counting 2 = Sensor Based Counting *Note that Counter Group 1 is always used. If set to "Not Used", it will revert to "Stroke Based Counting". Other groups can be "Not Used".*	Counters	1.10
299	**Counter Group 1 Increment.** For stroke based counters only, this is the amount the counters in the counter group will increment when they count. It is typically1, but a 2-out die could be set to 2. Valid values are 1 to 100.	Counters	1.10
300	**Counter Group 1 Frequency Position.** For stroke based counters only. This is where we are in the frequency count. It will range from 0 to 1 less than the counter frequency value. For instance, if the counter frequency is set to 10, it will count from 0 to 9. For the typical case where the counter frequency is 1 (we count every stroke), it will always be 0.	Counters	1.10

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
301	**Counter Group 1 Frequency.** For stroke based counters only. This is the frequency with which the counter will increment. For instance, if a lamination die puts out a part every 10 strokes, then set this value to 10.	Counters	1.10
302	**Counter Group 2 Type.** See Address 298 for usage.	Counters	1.10
303	**Counter Group 2 Increment.** See Address 299 for usage.	Counters	1.10
304	**Counter Group 2 Frequency Position.** See Address 300 for usage.	Counters	1.10
305	**Counter Group 2 Frequency.** See Address 301 for usage.	Counters	1.10
306	**Counter Group 3 Type.** See Address 298 for usage.	Counters	1.10
307	**Counter Group 3 Increment.** See Address 299 for usage.	Counters	1.10
308	**Counter Group 3 Frequency Position.** See Address 300 for usage.	Counters	1.10
309	**Counter Group 3 Frequency.** See Address 301 for usage.	Counters	1.10
310	**Counter Group 4 Type.** See Address 298 for usage.	Counters	1.10
311	**Counter Group 4 Increment.** See Address 299 for usage.	Counters	1.10
312	**Counter Group 4 Frequency Position.** See Address 300 for usage.	Counters	1.10
313	**Counter Group 4 Frequency.** See Address 301 for usage.	Counters	1.10
314	**Counter Group 5 Type.** See Address 298 for usage.	Counters	1.10
315	**Counter Group 5 Increment.** See Address 299 for usage.	Counters	1.10
316	**Counter Group 5 Frequency Position.** See Address 300 for usage.	Counters	1.10
317	**Counter Group 5 Frequency.** See Address 301 for usage.	Counters	1.10
318	**Counter Group 6 Type.** See Address 298 for usage.	Counters	1.10
319	**Counter Group 6 Increment.** See Address 299 for usage.	Counters	1.10
320	**Counter Group 6 Frequency Position.** See Address 300 for usage.	Counters	1.10
321	**Counter Group 6 Frequency.** See Address 301 for usage.	Counters	1.10
322	**Counter Group 7 Type.** See Address 298 for usage.	Counters	1.10
323	**Counter Group 7 Increment.** See Address 299 for usage.	Counters	1.10
324	**Counter Group 7 Frequency Position.** See Address 300 for usage.	Counters	1.10
325	**Counter Group 7 Frequency.** See Address 301 for usage.	Counters	1.10
326	**Counter Group 8 Type.** See Address 298 for usage.	Counters	1.10
327	**Counter Group 8 Increment.** See Address 299 for usage.	Counters	1.10
328	**Counter Group 8 Frequency Position.** See Address 300 for usage.	Counters	1.10
329	**Counter Group 8 Frequency.** See Address 301 for usage.	Counters	1.10
330	**Counter Group 9 Type.** See Address 298 for usage.	Counters	1.10

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
331	**Counter Group 9 Increment.** See Address 299 for usage.	Counters	1.10
332	**Counter Group 9 Frequency Position.** See Address 300 for usage.	Counters	1.10
333	**Counter Group 9 Frequency.** See Address 301 for usage.	Counters	1.10
334	**Counter Group 10 Type.** See Address 298 for usage.	Counters	1.10
335	**Counter Group 10 Increment.** See Address 299 for usage.	Counters	1.10
336	**Counter Group 10 Frequency Position.** See Address 300 for usage.	Counters	1.10
337	**Counter Group 10 Frequency.** See Address 301 for usage.	Counters	1.10
338	**Counter Group 11 Type.** See Address 298 for usage.	Counters	1.10
339	**Counter Group 11 Increment.** See Address 299 for usage.	Counters	1.10
340	**Counter Group 11 Frequency Position.** See Address 300 for usage.	Counters	1.10
341	**Counter Group 11 Frequency.** See Address 301 for usage.	Counters	1.10
342	**Counter Group 12 Type.** See Address 298 for usage.	Counters	1.10
343	**Counter Group 12 Increment.** See Address 299 for usage.	Counters	1.10
344	**Counter Group 12 Frequency Position.** See Address 300 for usage.	Counters	1.10
345	**Counter Group 12 Frequency.** See Address 301 for usage.	Counters	1.10
346	**Press Speed Setting**. Set the output speed of the press in strokes per minute (SPM). Note that unlike most settings, this setting can be changed while the press is running. Also note that when writing to this register, no other register can be written to in the same command.	General	1.12
347 – 349	Reserved		
350 – 413	**Scratch Pad Memory**. These are 64 registers that can be written to and read from for general scratch pad memory. They are lost when power goes down and will come back up as 0's. These are intended to allow a master on one interface (whether serial or TCP) to pass information to a master on another interface. Any of the 4 possible Modbus/TCP connections or 4 possible Modbus/RTU connections can read and write these registers.	General	1.12
414 – 483	Reserved		
484	**Tonnage Monitor Reverse Limits Bypassed.** 0 = Reverse limits are NOT bypassed 1 = Reverse Limits are bypassed.	Tonnage Monitor	1.13
485	**Tonnage Monitor Low Limits Bypassed.** 0 = Low limits are NOT bypassed 1 = Low Limits are bypassed.	Tonnage Monitor	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
486	**Tonnage Monitor Ch. 1 Peak High Limit:** This value is in the units selected in the tonnage monitor configuration area (English or Metric Tons). The decimal point value (see register 214 in the "Input Register" map) determines how to interpret this value. If the decimal point register is non-zero (which is the most common case), then all tonnage values should be interpreted as having 1 decimal place. For example, a tonnage value of 1007 would be 100.7 tons. If the decimal point register is 0, then a register value of 1007 would be 1007 tons.	Tonnage Monitor	1.13
487	**Tonnage Monitor Ch. 1 Peak Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
488	**Tonnage Monitor Ch. 1 Peak Reverse Limit:** See comments on Register 486	Tonnage Monitor	1.13
489	**Tonnage Monitor Ch. 2 Peak High Limit:** See comments on Register 486	Tonnage Monitor	1.13
490	**Tonnage Monitor Ch. 2 Peak Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
491	**Tonnage Monitor Ch. 2 Peak Reverse Limit:** See comments on Register 486	Tonnage Monitor	1.13
492	**Tonnage Monitor Ch. 3 Peak High Limit:** See comments on Register 486	Tonnage Monitor	1.13
493	**Tonnage Monitor Ch. 3 Peak Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
494	**Tonnage Monitor Ch. 3 Peak Reverse Limit:** See comments on Register 486	Tonnage Monitor	1.13
495	**Tonnage Monitor Ch. 4 Peak High Limit:** See comments on Register 486	Tonnage Monitor	1.13
496	**Tonnage Monitor Ch. 4 Peak Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
497	**Tonnage Monitor Ch. 4 Peak Reverse Limit:** See comments on Register 486	Tonnage Monitor	1.13
498	**Tonnage Monitor DW1 Enabled:** 0 = Data Window Disabled 1 = Data Window Enabled	Tonnage Monitor	1.13
499	**Tonnage Monitor DW1 Start Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
500	**Tonnage Monitor DW1 End Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
501	**Tonnage Monitor Ch. 1 DW1 High Limit:** See comments on Register 486	Tonnage Monitor	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
502	**Tonnage Monitor Ch. 1 DW1 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
503	**Tonnage Monitor Ch. 2 DW1 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
504	**Tonnage Monitor Ch. 2 DW1 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
505	**Tonnage Monitor Ch. 3 DW1 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
506	**Tonnage Monitor Ch. 3 DW1 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
507	**Tonnage Monitor Ch. 4 DW1 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
508	**Tonnage Monitor Ch. 4 DW1 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
509	**Tonnage Monitor DW2 Enabled:** 0 = Data Window Disabled 1 = Data Window Enabled	Tonnage Monitor	1.13
510	**Tonnage Monitor DW2 Start Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
511	**Tonnage Monitor DW2 End Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
512	**Tonnage Monitor Ch. 1 DW2 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
513	**Tonnage Monitor Ch. 1 DW2 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
514	**Tonnage Monitor Ch. 2 DW2 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
515	**Tonnage Monitor Ch. 2 DW2 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
516	**Tonnage Monitor Ch. 3 DW2 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
517	**Tonnage Monitor Ch. 3 DW2 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
518	**Tonnage Monitor Ch. 4 DW2 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
519	**Tonnage Monitor Ch. 4 DW2 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
520	**Tonnage Monitor DW3 Enabled:** 0 = Data Window Disabled 1 = Data Window Enabled	Tonnage Monitor	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
521	**Tonnage Monitor DW3 Start Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
522	**Tonnage Monitor DW3 End Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
523	**Tonnage Monitor Ch. 1 DW3 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
524	**Tonnage Monitor Ch. 1 DW3 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
525	**Tonnage Monitor Ch. 2 DW3 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
526	**Tonnage Monitor Ch. 2 DW3 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
527	**Tonnage Monitor Ch. 3 DW3 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
528	**Tonnage Monitor Ch. 3 DW3 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
529	**Tonnage Monitor Ch. 4 DW3 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
530	**Tonnage Monitor Ch. 4 DW3 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
531	**Tonnage Monitor DW4 Enabled:** 0 = Data Window Disabled 1 = Data Window Enabled	Tonnage Monitor	1.13
532	**Tonnage Monitor DW4 Start Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
533	**Tonnage Monitor DW4 End Angle:** In degrees assuming 1 decimal place. A value of 1234 is 123.4 degrees.	Tonnage Monitor	1.13
534	**Tonnage Monitor Ch. 1 DW4 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
535	**Tonnage Monitor Ch. 1 DW4 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
536	**Tonnage Monitor Ch. 2 DW4 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
537	**Tonnage Monitor Ch. 2 DW4 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
538	**Tonnage Monitor Ch. 3 DW4 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
539	**Tonnage Monitor Ch. 3 DW4 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
540	**Tonnage Monitor Ch. 4 DW4 High Limit:** See comments on Register 486	Tonnage Monitor	1.13
541	**Tonnage Monitor Ch. 4 DW4 Low Limit:** See comments on Register 486	Tonnage Monitor	1.13
542 – 639	Reserved		
640	5100 Press Control Based **PLS 1 Channel Mode**: 0 = Always Off 1 = Always On 2 = Normal 3 = Timed Off	PLS	1.11
641	5100 Press Control Based **PLS 1 Counted Outputs Mode**: 0 = Not Used 1 = Count By Stroke	PLS	1.11
642	5100 Press Control Based **PLS 1 Start Angle 1:** 0 to 359 degrees	PLS	1.11
643	5100 Press Control Based **PLS 1 End Angle 1:** 0 to 359 degrees	PLS	1.11
644	5100 Press Control Based **PLS 1 Start Angle 2:** 0 to 359 degrees	PLS	1.11
645	5100 Press Control Based **PLS 1 End Angle 2:** 0 to 359 degrees	PLS	1.11
646	5100 Press Control Based **PLS 1 On Time:** 0 to 65535 milliseconds	PLS	1.11
647	5100 Press Control Based **PLS 1 Counted Output Limit:** 0 to 65535	PLS	1.11
648	5100 Press Control Based **PLS 1 Counted Output Count:** 0 to 65535	PLS	1.11
649	5100 Press Control Based **PLS 1 Name Selector**	PLS	1.11
650 - 654	5100 Press Control Based **PLS 1 Reserved**	PLS	1.11
655 – 669	5100 Press Control PLS Channel 2 Settings See Channel 1 Settings (640 – 654) for layout and use.	PLS	1.11
670 – 684	5100 Press Control PLS Channel 3 Settings See Channel 1 Settings (640 – 654) for layout and use.	PLS	1.11
685 – 699	5100 Press Control PLS Channel 4 Settings See Channel 1 Settings (640 – 654) for layout and use.	PLS	1.11
700 – 714	5100 Press Control PLS Channel 5 Settings See Channel 1 Settings (640 – 654) for layout and use.	PLS	1.11
715 – 729	5100 Press Control PLS Channel 6 Settings See Channel 1 Settings (640 – 654) for layout and use.	PLS	1.11
730 – 744	5100 Press Control PLS Channel 7 Settings See Channel 1 Settings (640 – 654) for layout and use.	PLS	1.11

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
745 – 759	5100 Press Control PLS Channel 8 Settings See Channel 1 Settings (640 – 654) for layout and use.	PLS	1.11
760 – 879	Reserved		
880 – 909	5100-8 Ton Mon PLS Channel 1 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.11
910 – 939	5100-8 Ton Mon PLS Channel 2 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.11
940 – 969	5100-8 Ton Mon PLS Channel 3 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.11
970 – 999	5100-8 Ton Mon PLS Channel 4 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.11
1000	CAN Based **PLS Channel 1 Channel Mode**: 0 = Always Off 1 = Always On 2 = Normal 3 = Timed Off 4 = Toggle 5 = Input Driven Only ***Important Note:*** If this parameter is to be changed, always change this before the other settings as it may set some of them to default values based on the channel mode.	PLS	1.01
1001	CAN Based **PLS Channel 1 Speed Advance Mode**: 0 = No Speed Advance 1 = Leading Edge Only 2 = Trailing Edge Only 3 = Leading and Trailing Edge	PLS	1.01
1002	CAN Based **PLS Channel 1 Counted Outputs Mode**: 0 = Do Not Use Counted Output 1 = Count By Stroke	PLS	1.01
1003	CAN Based **PLS Channel 1 On Angle**: 0 to 359 degrees	PLS	1.01
1004	CAN Based **PLS Channel 1 Off Angle**: 0 to 359 degrees	PLS	1.01
1005	CAN Based **PLS Channel 1 On Time**: 0 to 65535 milliseconds	PLS	1.01
1006	CAN Based **PLS Channel 1 Speed Advance Lead Time**: 0 to 999 milliseconds	PLS	1.01
1007	CAN Based **PLS Channel 1 Speed Advance Trail Time**: 0 to 999 milliseconds	PLS	1.01

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
1008 - 1009	CAN Based **PLS Channel 1 Counted Output Limit**: 0 to 999999999 These 2 words should be set/requested in a single message.	PLS	1.01
1010 - 1011	CAN Based **PLS Channel 1 Counted Output Count**: 0 to 999999999 These 2 words should be set/requested in a single message.	PLS	1.01
1012	CAN Based **PLS Channel 1 Name Selector**:	PLS	1.01
1013	CAN Based **PLS Channel 1 Increase ON angle**: If this value is set to "3456" then the PLS ON angle will be increased one degree. This will always read as a "0". ***This can be written even when the press is running.***	PLS	1.01
1014	CAN Based **PLS Channel 1 Decrease ON angle**: If this value is set to "3456" then the PLS ON angle will be decreased one degree. This will always read as a "0". ***This can be written even when the press is running.***	PLS	1.01
1015	CAN Based **PLS Channel 1 Increase OFF angle**: If this value is set to "3456" then the PLS OFF angle will be increased one degree. This will always read as a "0". ***This can be written even when the press is running.***	PLS	1.01
1016	CAN Based **PLS Channel 1 Decrease OFF angle**: If this value is set to "3456" then the PLS OFF angle will be decreased one degree. This will always read as a "0". ***This can be written even when the press is running.***	PLS	1.01
1017	CAN Based **PLS Channel 1 Increase ON time**: If this value is set to "3456" then the PLS ON time will be increased one millisecond. This will always read as a "0". ***This can be written even when the press is running.***	PLS	1.01
1018	CAN Based **PLS Channel 1 Decrease ON time**: If this value is set to "3456" then the PLS ON time will be decreased one millisecond. This will always read as a "0". ***This can be written even when the press is running.***	PLS	1.01
1019	CAN Based **PLS Channel 1 Strip**: Strip setting when using part tracking functionality	PLS	1.11
1020	CAN Based **PLS Channel 1 Station**: Station setting when using part tracking functionality	PLS	1.11
1021 - 1029	CAN Based **PLS Channel 1 Reserved**	PLS	1.01
1030 - 1059	CAN Based PLS Channel 2 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1060 - 1089	CAN Based PLS Channel 3 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1090 - 1119	CAN Based PLS Channel 4 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
1120 - 1149	CAN Based PLS Channel 5 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1150 - 1179	CAN Based PLS Channel 6 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1180 - 1209	CAN Based PLS Channel 7 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1210 - 1239	CAN Based PLS Channel 8 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1240 - 1269	CAN Based PLS Channel 9 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1270 - 1299	CAN Based PLS Channel 10 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1300 - 1329	CAN Based PLS Channel 11 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1330 - 1359	CAN Based PLS Channel 12 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1360 - 1389	CAN Based PLS Channel 13 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1390 - 1419	CAN Based PLS Channel 14 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1420 - 1449	CAN Based PLS Channel 15 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1450 - 1479	CAN Based PLS Channel 16 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1480 - 1509	CAN Based PLS Channel 17 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1510 - 1539	CAN Based PLS Channel 18 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1540 - 1569	CAN Based PLS Channel 19 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1570 - 1599	CAN Based PLS Channel 20 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1600 - 1629	CAN Based PLS Channel 21 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1630 - 1659	CAN Based PLS Channel 22 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1660 - 1689	CAN Based PLS Channel 23 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1690 - 1719	CAN Based PLS Channel 24 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1720 - 1749	CAN Based PLS Channel 25 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
1750 - 1779	CAN Based PLS Channel 26 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1780 - 1809	CAN Based PLS Channel 27 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1810 - 1839	CAN Based PLS Channel 28 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1840 - 1869	CAN Based PLS Channel 29 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1870 - 1899	CAN Based PLS Channel 30 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1900 - 1929	CAN Based PLS Channel 31 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1930 - 1959	CAN Based PLS Channel 32 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.01
1960 - 1989	CAN Based PLS Channel 33 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
1990 - 2019	CAN Based PLS Channel 34 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2020 - 2049	CAN Based PLS Channel 35 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2050 - 2079	CAN Based PLS Channel 36 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2080 - 2109	CAN Based PLS Channel 37 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2110 - 2139	CAN Based PLS Channel 38 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2140 - 2169	CAN Based PLS Channel 39 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2170 - 2199	CAN Based PLS Channel 40 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2200 - 2229	CAN Based PLS Channel 41 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2230 - 2259	CAN Based PLS Channel 42 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2260 - 2289	CAN Based PLS Channel 43 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2290 - 2319	CAN Based PLS Channel 44 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2320 - 2349	CAN Based PLS Channel 45 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2350 - 2379	CAN Based PLS Channel 46 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
2380 - 2409	CAN Based PLS Channel 47 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2410 - 2439	CAN Based PLS Channel 48 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2440 - 2469	CAN Based PLS Channel 49 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2470 - 2499	CAN Based PLS Channel 50 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2500 - 2529	CAN Based PLS Channel 51 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2530 - 2559	CAN Based PLS Channel 52 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2560 - 2589	CAN Based PLS Channel 53 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2590 - 2619	CAN Based PLS Channel 54 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2620 - 2649	CAN Based PLS Channel 55 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2650 - 2679	CAN Based PLS Channel 56 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2680 - 2709	CAN Based PLS Channel 57 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2710 - 2739	CAN Based PLS Channel 58 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2740 - 2769	CAN Based PLS Channel 59 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2770 - 2799	CAN Based PLS Channel 60 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2800 - 2829	CAN Based PLS Channel 61 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2830 - 2859	CAN Based PLS Channel 62 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2860 - 2889	CAN Based PLS Channel 63 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2890 - 2919	CAN Based PLS Channel 64 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2920 - 2949	CAN Based PLS Channel 65 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2950 - 2979	CAN Based PLS Channel 66 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
2980 - 3009	CAN Based PLS Channel 67 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
3010 - 3039	CAN Based PLS Channel 68 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3040 - 3069	CAN Based PLS Channel 69 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3070 - 3099	CAN Based PLS Channel 70 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3100 - 3129	CAN Based PLS Channel 71 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3130 - 3159	CAN Based PLS Channel 72 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3160 - 3189	CAN Based PLS Channel 73 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3190 - 3219	CAN Based PLS Channel 74 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3220 - 3249	CAN Based PLS Channel 75 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3250 - 3279	CAN Based PLS Channel 76 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3280 - 3309	CAN Based PLS Channel 77 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3310 - 3339	CAN Based PLS Channel 78 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3340 - 3369	CAN Based PLS Channel 79 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3370 - 3399	CAN Based PLS Channel 80 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3400 - 3429	CAN Based PLS Channel 81 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3430 - 3459	CAN Based PLS Channel 82 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3460 - 3489	CAN Based PLS Channel 83 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3490 - 3519	CAN Based PLS Channel 84 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3520 - 3549	CAN Based PLS Channel 85 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3550 - 3579	CAN Based PLS Channel 86 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3580 - 3609	CAN Based PLS Channel 87 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3610 - 3639	CAN Based PLS Channel 88 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
3640 - 3669	CAN Based PLS Channel 89 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3670 - 3699	CAN Based PLS Channel 90 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3700 - 3729	CAN Based PLS Channel 91 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3730 - 3759	CAN Based PLS Channel 92 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3760 - 3789	CAN Based PLS Channel 93 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3790 - 3819	CAN Based PLS Channel 94 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3820 - 3849	CAN Based PLS Channel 95 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3850 - 3879	CAN Based PLS Channel 96 Settings See PLS Channel 1 Settings (1000 – 1029) for layout and use.	PLS	1.04
3880 - 3889	Reserved		
3900	512X **Die Prot. Module 1, Channel 1 Channel Mode**: 0 = Not Used 1 = Static 2 = Cyclic 3 = Transfer 4 = In Position 5 = 1 Part Detector Edge 6 = 1 Part Detector Pass 7 = 2 Part Detector Edge 8 = 2 Part Detector Pass 9 = Custom 10 = Part Detect Anywhere ***Important Note:*** If this parameter is to be changed, always change this before the other settings as it may set some of them to default values based on the channel mode.	Die Protection	1.13
3901	512X **Die Prot. Module 1, Channel 1 Input Type**: 0 = Normally Off 1 = Normally On	Die Protection	1.13
3902	512X **Die Prot. Module 1, Channel 1 Sensor Type**: 0 = NPN (Sink) 1 = PNP (Source)	Die Protection	1.13
3903	512X **Die Prot. Module 1, Channel 1 Window On Angle**: 0 to 359 degrees	Die Protection	1.13
3904	512X **Die Prot. Module 1, Channel 1 Window Off Angle**: 0 to 359 degrees	Die Protection	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
3905	512X **Die Prot. Module 1, Channel 1 Time Delay**: 0 to 65535 milliseconds	Die Protection	1.13
3906	512X **Die Prot. Module 1, Channel 1 Delay Strokes**: 0 to 255 Strokes	Die Protection	1.13
3907	512X **Die Prot. Module 1, Channel 1 Separation Time**: 0 to 9999 milliseconds	Die Protection	1.13
3908	512X **Die Prot. Module 1, Channel 1 Stop Type**: 0 = Immediate Stop 1 = Top Stop 2 = Intelli-Stop 3 = Mark Part as Bad	Die Protection	1.13
3909	512X **Die Prot. Module 1, Channel 1 Counter Select**: Selects which sensor based counter to increment 0 = None 1 = Part Count 1 2 = Part Count 2 3 = Part Count 3 4 = Part Count 4 5 = Part Count 5 6 = Part Count 6 7 = Part Count 7 8 = Part Count 8 9 = Part Count 9 10 = Part Count 10 11 = Part Count 11 12 = Part Count 12 13 = Scrap Count 1 14 = Scrap Count 2 15 = Scrap Count 3 16 = Scrap Count 4 17 = Scrap Count 5 18 = Scrap Count 6 19 = Scrap Count 7 20 = Scrap Count 8 21 = Scrap Count 9 22 = Scrap Count 10 23 = Scrap Count 11 24 = Scrap Count 12	Die Protection	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
3910	512X **Die Prot. Module 1, Channel 1 Bypass Select**: 0 = Not Bypassed 1 = Bypassed 2 = Bypassed if Good Part at Station 3 = Bypassed if Bad Part at Station 4 = Bypassed if Empty Part at Station 5 = Bypassed if NOT Good Part at Station 6 = Bypassed if NOT Bad Part at Station 7 = Bypassed if NOT Empty Part at Station	Die Protection	1.13
3911	512X **Die Prot. Module 1, Channel 1 Job Recall Bypass Strokes**: 0 to 255 Strokes	Die Protection	1.13
3912	512X **Die Prot. Module 1, Channel 1 Bypass in Setup Mode**: 0 = Not automatically bypassed in setup mode 1 = Automatically bypassed in setup mode	Die Protection	1.13
3913	512X **Die Prot. Module 1, Channel 1 Name Select:**	Die Protection	1.13
3914	512X **Die Prot. Module 1, Channel 1 Strip Select**: Strip setting when using part tracking functionality	Die Protection	1.13
3915	512X **Die Prot. Module 1, Channel 1 Station Select**: Station setting when using part tracking functionality	Die Protection	1.13
3916	512X **Die Prot. Module 1, Channel 1 Rules**: Rules Word when using "Custom" Channel Type	Die Protection	1.13
3917	512X **Die Prot. Module 1, Channel 1 Detection in Window**: Number of Detections required in window when using "Custom" Channel Type	Die Protection	1.13
3918	512X **Die Prot. Module 1, Channel 1 Reserved**:	Die Protection	1.13
3919	512X **Die Prot. Module 1, Channel 1 Reserved**:	Die Protection	1.13
3920	512X **Die Prot. Module 1, Channel 1 Reserved**:	Die Protection	1.13
3921	512X **Die Prot. Module 1, Channel 1 Reserved**:	Die Protection	1.13
3922	512X **Die Prot. Module 1, Channel 1 Reserved**:	Die Protection	1.13
3923	512X **Die Prot. Module 1, Channel 1 Reserved**:	Die Protection	1.13
3924 – 3947	512X Die Prot. Module 1, Channel 2 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
3948 – 3971	512X Die Prot. Module 1, Channel 3 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
3972 – 3995	512X Die Prot. Module 1, Channel 4 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
3996 – 4019	512X Die Prot. Module 1, Channel 5 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4020 – 4043	512X Die Prot. Module 1, Channel 6 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4044 – 4067	512X Die Prot. Module 1, Channel 7 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4068 – 4091	512X Die Prot. Module 1, Channel 8 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4092 – 4115	512X Die Prot. Module 1, Channel 9 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4116 – 4139	512X Die Prot. Module 1, Channel 10 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4140 – 4163	512X Die Prot. Module 1, Channel 11 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4164 – 4187	512X Die Prot. Module 1, Channel 12 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4188 – 4211	512X Die Prot. Module 1, Channel 13 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4212 – 4235	512X Die Prot. Module 1, Channel 14 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4236 – 4259	512X Die Prot. Module 1, Channel 15 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4260 – 4283	512X Die Prot. Module 1, Channel 16 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4284 – 4307	512X Die Prot. Module 2, Channel 1 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4308 – 4331	512X Die Prot. Module 2, Channel 2 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4332 – 4355	512X Die Prot. Module 2, Channel 3 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4356 – 4379	512X Die Prot. Module 2, Channel 4 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4380 – 4403	512X Die Prot. Module 2, Channel 5 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4404 – 4427	512X Die Prot. Module 2, Channel 6 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4428 – 4451	512X Die Prot. Module 2, Channel 7 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4452 – 4475	512X Die Prot. Module 2, Channel 8 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
4476 – 4499	512X Die Prot. Module 2, Channel 9 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4500 – 4523	512X Die Prot. Module 2, Channel 10 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4524 – 4547	512X Die Prot. Module 2, Channel 11 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4548 – 4571	512X Die Prot. Module 2, Channel 12 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4572 – 4595	512X Die Prot. Module 2, Channel 13 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4596 – 4619	512X Die Prot. Module 2, Channel 14 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4620 – 4643	512X Die Prot. Module 2, Channel 15 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4644 – 4667	512X Die Prot. Module 2, Channel 16 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4668 – 4691	512X Die Prot. Module 3, Channel 1 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4692 – 4715	512X Die Prot. Module 3, Channel 2 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4716 – 4739	512X Die Prot. Module 3, Channel 3 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4740 – 4763	512X Die Prot. Module 3, Channel 4 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4764 – 4787	512X Die Prot. Module 3, Channel 5 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4788 – 4811	512X Die Prot. Module 3, Channel 6 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4812 – 4835	512X Die Prot. Module 3, Channel 7 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4836 – 4859	512X Die Prot. Module 3, Channel 8 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4860 – 4883	512X Die Prot. Module 3, Channel 9 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4884 – 4907	512X Die Prot. Module 3, Channel 10 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4908 – 4931	512X Die Prot. Module 3, Channel 11 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4932 – 4955	512X Die Prot. Module 3, Channel 12 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
4956 – 4979	512X Die Prot. Module 3, Channel 13 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
4980 – 5003	512X Die Prot. Module 3, Channel 14 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5004 – 5027	512X Die Prot. Module 3, Channel 15 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5028 – 5051	512X Die Prot. Module 3, Channel 16 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5052 – 5075	512X Die Prot. Module 4, Channel 1 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5076 – 5099	512X Die Prot. Module 4, Channel 2 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5100 – 5123	512X Die Prot. Module 4, Channel 3 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5124 – 5147	512X Die Prot. Module 4, Channel 4 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5148 – 5171	512X Die Prot. Module 4, Channel 5 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5172 – 5195	512X Die Prot. Module 4, Channel 6 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5196 – 5219	512X Die Prot. Module 4, Channel 7 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5220 – 5243	512X Die Prot. Module 4, Channel 8 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5244 – 5267	512X Die Prot. Module 4, Channel 9 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5268 – 5291	512X Die Prot. Module 4, Channel 10 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5292 – 5315	512X Die Prot. Module 4, Channel 11 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5316 – 5339	512X Die Prot. Module 4, Channel 12 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5340 – 5363	512X Die Prot. Module 4, Channel 13 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5364 – 5387	512X Die Prot. Module 4, Channel 14 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5388 – 5411	512X Die Prot. Module 4, Channel 15 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5412 – 5435	512X Die Prot. Module 4, Channel 16 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5436 – 5459	512X Die Prot. Module 5, Channel 1 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5460 – 5483	512X Die Prot. Module 5, Channel 2 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
5484 – 5507	512X Die Prot. Module 5, Channel 3 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5508 – 5531	512X Die Prot. Module 5, Channel 4 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5532 – 5555	512X Die Prot. Module 5, Channel 5 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5556 – 5579	512X Die Prot. Module 5, Channel 6 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5580 – 5603	512X Die Prot. Module 5, Channel 7 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5604 – 5627	512X Die Prot. Module 5, Channel 8 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5628 – 5651	512X Die Prot. Module 5, Channel 9 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5652 – 5675	512X Die Prot. Module 5, Channel 10 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5676 – 5699	512X Die Prot. Module 5, Channel 11 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5700 – 5723	512X Die Prot. Module 5, Channel 12 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5724 – 5747	512X Die Prot. Module 5, Channel 13 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5748 – 5771	512X Die Prot. Module 5, Channel 14 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5772 – 5795	512X Die Prot. Module 5, Channel 15 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5796 – 5819	512X Die Prot. Module 5, Channel 16 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5820 – 5843	5100-8 T.M. Die Prot. Channel 1 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5844 – 5867	5100-8 T.M. Die Prot. Channel 2 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5868 – 5891	5100-8 T.M. Die Prot. Channel 3 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5892 – 5915	5100-8 T.M. Die Prot. Channel 4 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5916 – 5939	OT805 Die Prot. Channel 1 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5940 – 5963	OT805 Die Prot. Channel 2 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13
5964 – 5987	OT805 Die Prot. Channel 3 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13

Modbus "Holding Register" Map Read and Write through Function Codes 0x03, 0x06, 0x10, and 0x17			
Address	**Meaning**	**System**	**Rev**
5988 – 6011	OT805 Die Prot. Channel 4 Settings See Die Prot Channel 1 Settings (3900 – 3923) for layout and use.	Die Protection	1.13

4 CONFIGURATION

Before the Modbus operation screens will appear in the "Auxiliary Comm" area, the Modbus interfaces must be configured.

> **NOTE:** The Modbus interface is optional. No Modbus RTU or Modbus TCP interface screen will appear unless the Modbus interface is enabled at the factory or through a Challenge/Response activation method in the field.

4.1 Modbus RTU Configuration

To get to the auxiliary communications configuration screen:

- From nearly any screen in the operator terminal, press the **ACC** softkey (near the upper right-hand corner of the display). If this key is not visible, the operator terminal is already in the Quick Access area or a sub-screen of it. Hit **Exit** until the key appears.
- Press the **Auxiliary Comm.** Softkey.
- Press the **Configure** softkey. This key is visible only when the RUN/PROG key in the PROG position. Enter the configuration code when prompted.

> **NOTE:** An access code is required to reach the configuration menus. The code is provided separately from this manual for administrative control.

The Auxiliary Comm. Configuration screen shows the serial ports on the operator terminal. Immediately to the right of each port in a blue bordered box is the communication function it is currently running. Press inside the blur bordered box to bring up a list of the available communication functions that can be run on the port. For OT806 operator terminals, there are 4 different Modbus RTU interfaces available to assign to serial ports. For OT805 terminals, there is one Modbus RTU interface available.

Once a Modbus RTU Interface is assigned to a port, press the **Configure** softkey to the right of the port to go to the Modbus RTU configuration screen. For OT806 terminals, all the parameters for this interface are on one screen. For OT805 terminals, use the **Previous Page** and **Next Page** softkeys to see all the parameters.

The items on the cushion configuration screen are:

Modbus Slave ID The slave ID of the operator terminal on the bus. Each slave device on a given bus MUST have a unique ID from 1 to 247. Messages from the master are addresses to a given slave ID.

Min Turnaround Delay This sets a minimum amount of time that will elapse before the operator terminal will reply to a message. This is typically used to support an RS-232 to RS-485 converter that needs some time after a transmission in one direction has stopped to "turn the line around" for transmission in the other direction. There can be more time than this before a reply is sent, but never less.

Max. Data Wait Time The maximum amount of time to wait for a written parameter to be updated before the operator terminal will either reply with the data it has, or send an exception response. When some settings are sent through Modbus, they then have to be relayed to the device on the control bus (for instance, a die protection unit or programmable limit switch). If a PLS start angle is changed through Modbus, the requested change is then sent to the PLS and the operator terminal will then wait for the PLS to acknowledge the change and make sure that the data value sent was valid (the PLS would clamp an "On Angle" of 370 degrees to 359, for instance). Once the value is acknowledged, the operator terminal will then send the reply.

Delay Read Reply Until Data Updated If this is set to "Yes", then a read request will wait up to the "Max. Data Wait Time" for all data requested to be updated (as described under "Max. Data Wait Time"). This would usually only happen if "Delay Write Reply Until Data Updated" is set to "No" and a read is requested of data that has just been written.

Delay Write Reply Until Data Updated If this is set to "Yes", then a write request will wait up to the "Max. Data Wait Time" for all data written to be updated (as described under "Max. Data Wait Time"). This should guarantee that any following reads for verification of the write will read updated data.

Reply Normally After Data Update Timeout If this is set to "Yes", then a normal reply will be sent from a read or write that is waiting for updated data after the "Max. Data Wait Time" has expired. Otherwise, an exception response will be sent.

Allow Job Recall If set to "Yes", then writes to the job number register pair will be allowed and will recall the job number written, if it exists. Otherwise, jobs are not allowed to be recalled through the Modbus interface.

Allow Settings If this is set to "Yes", then writes to settings such as PLS channel settings, counters, etc., are allowed. Otherwise those registers are only allowed to be read and an exception response will be returned if a write is attempted.

Baud Rate The Baud Rate of the serial port. All units on the bus should share the same serial port settings.

Parity The Parity of the serial port. All units on the bus should share the same serial port settings.

Data Bits The Data Bits of the serial port. All units on the bus should share the same serial port settings.

Stop Bits The Stop Bits of the serial port. All units on the bus should share the same serial port settings.

4.2 Modbus TCP Configuration

To get to the auxiliary communications configuration screen:

- From nearly any screen in the operator terminal, press the **ACC** softkey (near the upper right-hand corner of the display). If this key is not visible, the operator terminal is already in the Quick Access area or a sub-screen of it. Hit **Exit** until the key appears.
- Press the **Auxiliary Comm.** softkey.
- Press the **Configure** softkey. This key is visible only when the RUN/PROG key in the PROG position. Enter the configuration code when prompted.

> **NOTE:** An access code is required to reach the configuration menus. The code is provided separately from this manual for administrative control.

The Auxiliary Comm. Configuration screen shows the serial ports on the operator terminal and has a softkey to configure Ethernet functionality. Press the **Configure Ethernet** softkey to go to the Ethernet configuration screen. If Ethernet has not already been configured, then that should be done before setting up the Modbus TCP parameters. The Ethernet parameters are:

Local Host Name This name can be used in some places in place of the IP address to find the unit. So instead of connecting to an IP address like 192.168.1.1, a name like LINK805_001001 can be used. Not all networks will support this usage.

Use DHCP If set to "Yes", this will use Dynamic Host Configuration Protocol to get an IP address, subnet mask, and the other parameters below for the Ethernet interface. Otherwise, all that information must be supplied by the user. This is usually only useful when using the "Local Host Name" as the IP address may change from time to time.

IP Address This parameter only appears if "Use DHCP" is set to "No". This is the IP address for this unit. Consult your network administrator for this value as using an address that is already present on the network can cause serious network problems!

Subnet Mask This parameter only appears if "Use DHCP" is set to "No". Consult your network administrator for this value.

Default Gateway This parameter only appears if "Use DHCP" is set to "No". Consult your network administrator for this value.

Primary DNS This parameter only appears if "Use DHCP" is set to "No". Consult your network administrator for this value.

Secondary DNS This parameter only appears if "Use DHCP" is set to "No". Consult your network administrator for this value.

Once the Ethernet parameters are set, press the **Configure Modbus TCP** softkey to go to the Modbus TCP configuration screen. For OT806 terminals, all the parameters for this interface are on one screen. For OT805 terminals, use the **Previous Page** and **Next Page** softkeys to see all the parameters.

The items on the cushion configuration screen are:

Min Turnaround Delay This sets a minimum amount of time that will elapse before the operator terminal will reply to a message. This is typically used to support an RS-232 to RS-485 converter that needs some time after a transmission in one direction has stopped to "turn the line around" for transmission in the other direction. There can be more time than this before a reply is sent, but never less.

Max. Data Wait Time The maximum amount of time to wait for a written parameter to be updated before the operator terminal will either reply with the data it has, or send an exception response. When some settings are sent through Modbus, they then have to be relayed to the device on the control bus (for instance, a die protection unit or programmable limit switch). If a PLS start angle is changed through Modbus, the requested change is then sent to the PLS and the operator terminal will then wait for the PLS to acknowledge the change and make sure that the data value sent was valid (the PLS would clamp an "On Angle" of 370 degrees to 359, for instance). Once the value is acknowledged, the operator terminal will then send the reply.

Delay Read Reply Until Data Updated If this is set to "Yes", then a read request will wait up to the "Max. Data Wait Time" for all data requested to be updated (as described under "Max. Data Wait Time"). This would usually only happen if "Delay Write Reply Until Data Updated" is set to "No" and a read is requested of data that has just been written.

Delay Write Reply Until Data Updated If this is set to "Yes", then a write request will wait up to the "Max. Data Wait Time" for all data written to be updated (as described under "Max. Data Wait Time"). This should guarantee that any following reads for verification of the write will read updated data.

Reply Normally After Data Update Timeout If this is set to "Yes", then a normal reply will be sent from a read or write that is waiting for updated data after the "Max. Data Wait Time" has expired. Otherwise, an exception response will be sent.

Allow Job Recall If set to "Yes", then writes to the job number register pair will be allowed and will recall the job number written, if it exists. Otherwise, jobs are not allowed to be recalled through the Modbus interface.

Allow Settings If this is set to "Yes", then writes to settings such as PLS channel settings, counters, etc., are allowed. Otherwise those registers are only allowed to be read and an exception response will be returned if a write is attempted.

Socket 1 Port The port number to use for Modbus TCP on socket 1. The standard port to use for Modbus TCP is 502. In some cases, however, it may be necessary to use a different port.

Socket 2 Port The port number to use for Modbus TCP on socket 2. Only present on OT806 operator terminals.

Socket 3 Port The port number to use for Modbus TCP on socket 3. Only present on OT806 operator terminals.

Socket 4 Port The port number to use for Modbus TCP on socket 4. Only present on OT806 operator terminals.