

# S-Series MODBUS Function Diagram

062519 – R10.2

The Pump will only respond to MODBUS commands if the "Modbus Control Enable" option is set to "YES" in the configuration menu.

Pumps response to the MODBUS request sent from the Master for the FC=06 Function Codes:

MODBUS Protocol Instructions sent from the MASTER to the SLAVE (our pump) telling it what to do...

Start / Stop Pump ; Fault Reset	
FC=06: Preset Single Register (Analog Output Holding Registers, 4x0001)	START Pump → 02 06 0000 0001 4839
	STOP Pump → 02 06 0000 0000 89F9
	Fault Reset → 02 06 0000 0002 0838

Note: When sending a Pump Mode change command – The pump will be placed in a "STOPPED" condition when received.

Pump Mode:	
FC=06: Preset Single Register (Analog Output Holding Registers, 4x0002)	Manual Mode → 02 06 0001 0001 19F9
	4-20mA Input Mode → 02 06 0001 0002 59F8
	0-10Vdc Input Mode → 02 06 0001 0003 9838
	Pulse Input Mode → 02 06 0001 0004 D9FA

Manual Mode Speed Setting:	
FC=06: Preset Single Register (Analog Output Holding Registers, 4x0003)	Min = 0% → 02 06 0002 0000 2839
	Max = 100% → 02 06 0002 0064 29D2

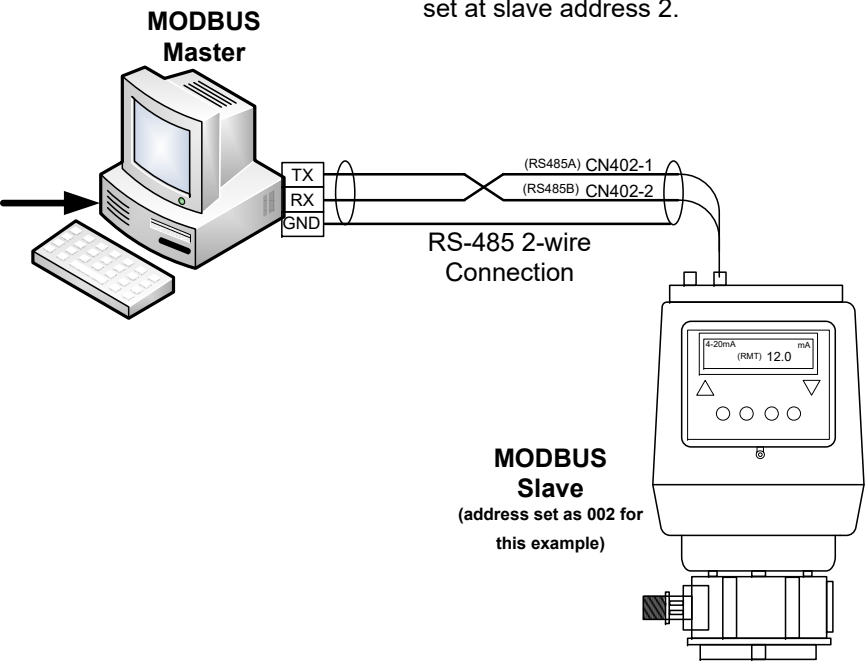
MODBUS Protocol Instructions sent from the MASTER to the SLAVE (our pump) Requesting Information...

Request Current Motor Speed (%)	FC=03: Read Holding Registers (Analog Output Holding Registers, 4x0004)	→ 02 03 0003 0001 7439
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Request Tube Timer Reading (hours)	FC=03: Read Holding Registers (Analog Output Holding Registers, 4x0005)	→ 02 03 0004 0001 C5F8
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Request Pump Status BITS	FC=03: Read Holding Registers (Analog Output Holding Registers, 4x0006)	→ 02 03 0005 0001 9438
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NOTE: CRC's in this example are calculated with the pump set at slave address 2.



Pumps response to the MODBUS request sent from the Master for the FC=03 Function Codes:

Request Current Motor Speed (%)	
Min = 0%	The Pump will return the current speed % (as a hex value) in the MODBUS data structure. (see details)
Max = 100%	

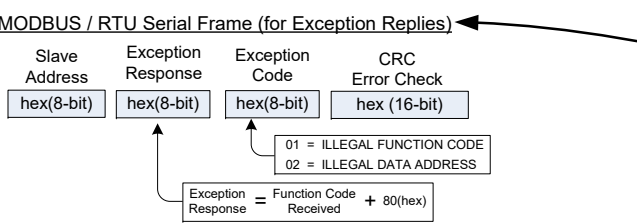
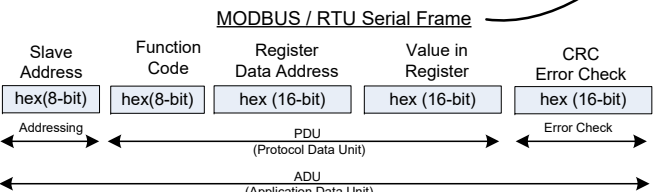
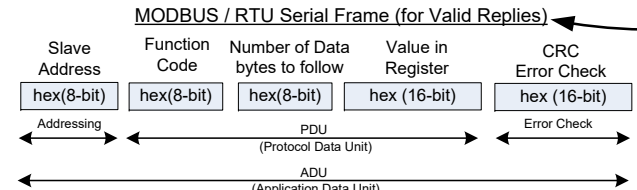
Request Tube Timer Reading (hours)	
0	The Pump will return the current Run Time hour (as a hex value) in the MODBUS data structure. (see details)
9999	

Request Pump Status BITS	
Remote	Bit 0
Run	Bit 1
Standby	Bit 2
Drive Fault	Bit 3
Tube Timer	Bit 4
Flow Detect	Bit 5
Low Signal	Bit 6
High Signal	Bit 7
Low Flow	Bit 8
High Flow	Bit 9
Signal Overrun	Bit10
Transfer	Bit11
Tube Leak	Bit12
Reserved	Bit13
Reserved	Bit14
Reserved	Bit15

Pumps response to the MODBUS request sent from the Master that are not recognized. These are referred to as Exception Responses:

Exception Response for ILLEGAL DATA ADDRESS (02)  
 02 83 02 30F1  
 The data address received in the query is not an allowable address for the slave. This code will be returned if the data field is not valid for the Function Code. (0000,0001, or 0002)

Exception Response for ILLEGAL DATA ADDRESS (02)  
 02 86 02 33A1  
 The data address received in the query is not an allowable address for the slave. This code will be returned if the data field is not valid for the Function Code. (0003,0004, or 0005)



Examples for ILLEGAL Function Code (01)

ILLEGAL or INVALID Command from MASTER to SALVE	Exception Reply from SLAVE to MASTER
02 01 0005 0001 EDF8	→ 02 81 01 7190
02 05 0003 0011 FDF5	→ 02 85 01 7350
02 0F 0003 0011 65F4	→ 02 8F 01 75F0
02 10 0005 0011 1037	→ 02 90 01 7DC0

Exception Code for an ILLEGAL Function Code (01)  
 02 xx 01 xxxx  
 The Function Code received in the query is not an allowable Function for the slave. This code will be returned to the master if the Function Code is anything but 03 or 06.

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