DATEXEL LLC

Modbus RTU Analog and Digital IO DAT3012. Set Up the DAT3012.

- 1. Connect 24 Vdc to I and J.
- 2. Connect RS485 to A and B.
- 3. Connect an Input to the Analog A. For this application note we have chosen the default setting of an RTD.
- 4. To check the Digital Input Connect 24Vdc across DI_C and DI_1.
- 5. Connect a Multimeter between terminal D and E to read the 4-20mA output.
- 6. Connect a Multimeter to measure the output of the relay on Terminal K and L, which is Relay Output 0
- 7. If the communication parameters are unknown, short out the INIT connections H and I.
- 8. Power up the DAT3012 Modbus RTU Slave.

SHLD 4 GEN ALOG OUTPL AUX D GND Analog Input B OUT 0 Output 0 7 IN 3 OUT_1 Output 1 IN_4 GNA INIT INIT Power v. 0 +1 Supply DAT3012 V+ 9 4 IN 6 Relay Output 0 R0 C ĸ CE Relay R1 C Digital Inputs Output 1 Relay R2 C Output 2

RS485

It is advisable to use the DAT3580 to connect the DAT3012 to the PC. The advantage of using the DAT3580 is that it will isolate your PC from the DAT3012. The DAT3580 options are USB, Ethernet and RS232. If the DAT3580USB version is used, install the USB drivers. If the DAT3580MBTCP or the DAT3580GW are used, make sure the Ethernet parameters are compatible with the net, and transmission of data over port 502 is allowed.

Set Up the PC.

- 1. Download the 3000-10000 Software from www.datexel.com download page.
- 2. Close all other software.
- 3. UnZIP the Modbus_3000_10000_setup software.
- 4. Run the 3000-10000 software.
- 5. To start the software click the English version.

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Set Up Communication.

- 1. The software should automatically select the correct comms port. It is possible to override the comms port or refresh if you change the physical port.
- 2. Choose the correct Com port settings.
- 3. Click Open Com. The Port Status will change to green.
- 4. The default Baud rate is either written on the Label or 38400bps. If the INIT is shorted, the Baud rate will be 9600bps, RTU, Data Bit 8, Stop Bit1, Parity None.

MODBUS_D	AT3000_DAT10000			- • ×
File Tools	Model			
COM Port	Refreeh COM Port list	Open Com Close Com	Port status	
Com port s	ettings			
Baud rate				
9600	•			
Mode				
RTU				
Data bit				
8	•			
Stop bit				
1	*			
Parity				
None				
Query				

Selecting the Modbus RTU IO Module DAT3012.

- 1. The green light only indicates the port is open. Even if the settings are incorrect the light will turn green.
- 2. Select Model and the drop down navigation will appear.
- 3. Select DAT3012.



Setting the address of the DAT3012 Modbus Slave.

- 1. Change the Address to connect to 1 or what is written on the label.
- 2. Click "Read data" (Single poll).
- 3. The screen should now display the below screen.
- 4. If there is a function error, no CRC match, check Baud rate, RS485 connection or Modbus Slave Address.
- 5. This needs to be fixed before further progress. If you have not used the INIT on terminals H and I, it is highly recommended that you do now. Then return to Communication set up and set the settings to 9600bps, RTU, Data Bit 8, Stop Bit1, Parity None.
- 6. This will always be the correct setting unless it differs on the label.

DAT3012					
DAT3012 - Slave 4	85, 2 AIN, 2 AO, 4 DI, 3	Address to connect 3 DO, 2 OUT AN	1 Read data (Single poll)	Continuous Read	Stop on Error
Input type CH0 Pt100 • Write	Measures 22.7	Type 1 here for address 1.	Digital inputs	Counters 0 0 1 0	Comm. parameters Address 1 Write Baud-rate 38400 -
CH1 P:100 -	852.0		Digital inputs Rise latch	2 0 3 0 This area only populates after communication is	Party None Image: Constraint of the second
Output type CH0 mA CH1 mA	Measures 0.000 Write 0.000 Write	Power-Up Safe 0.000 Write 0.000 Write 0.000 Write 0.000 Write	Digital inputs Fall Latch Clear Fall Latch	successful.	Name 3012 Write FW vers. D470 WDT(x0.5 s) 10 Write
				Dig. In Frequency 0 0.00 1 0.00	Delay(x1 me) 1 Wite Wdt_en Wdt_ev Pup_ev
				2 0.00 3 0.00 Power-U	Jp Safe
			Ungna oukputs 🧧 📕 🗶	00	Write 00 Write
		WWW.C	latexel.con	n	

Reading the analog input on the DAT3012.

- 1. Connect a sensor to the input terminals for chosen sensor, We have selected an RTD for this application note.
- 2. Select the correct sensor from the drop down option under Input Type.
- 3. Click the Write button.
- 4. Click the Read data button.
- 5. The correct sensor reading should be under the Measure label.

O DAT3012		10100 2	
DAT3012 - Slave 485, 2	Address to connect 2 AIN, 2 AO, 4 DI, 3 DO, 2 OUT AN	1 Read data (Single poll) Continuous Read	Stop on Error
CH0 Pt100 • Write 22 CH1 Pt100 • 85	Change the Input type to RTD. Under measure will be the actual Measured temperature.	Digital inputs Counters Digital inputs Rise tatoh Digital inputs Rise tat	Comm. parameters Address 1 Baudrate 38400 ↓ Parity None ↓ N* Bit 8 \$ Stop 1 ↓ Mode RTU ↓ Write Name 3012 Write
Output type Mea CH0 mA ▼ 0.4 CH1 mA ▼ 0.1	Power-Up Safe 0.000 Write 0.000 Write 0.000 Write 0.000 Write 0.000 Write 0.000 Write 0.000 Write 0.000 Write 0.000 Write	Digital inputs Fall Latch Ciear Fall Latch Reset al counters Dig. In Frequency 0 0.00	Name Strike FW vers. D470 WDT(x0.5 s) 10 Write Delay(x1 ms) Wdt_en Wdt_ev
		1 0.00 2 0.00 3 0.00 Digital outputs 0 1 2 00 00	r-Up Safe Write 00 Write

Digital input and Counter DAT3012 Modbus Slave.

- 1. Connect 24Vdc to the Input terminals 18 and 19
- 2. Click Continue read
- 3. The channel 0 box under the Digital Input should change state to red.
- 4. Remove the 24 Vdc and the box should return to gray.
- 5. The counter increases by 1 each time the connection is made.
- 6. The counter can be reset when the reset all counters is clicked.
- 7. Should a function generator be connected and set to a particular frequency this can be seen under the frequency box.

O DAT3012				x
DAT3012 - Slave	Address to connect 485, 2 AIN, 2 AO, 4 DI, 3 DO, 2 OUT AN	t 1 Read data (Single poll)	Stop Stop on Error	
Input type CH0 Pt100 Virte	Measures 212 The Digital input is in red when	Digital inputs	Counters Counters Comm. parameters Address Comm. parameters Address Winte Baud-rate 38400	
CH1 P:100 -	it is activated and counter incre 852.0 to 29.	ISES Digital inputs Rise latch Clear Rise Latch	2 0 3 0 Mode RTU ▼ Winte	• 1 •
Output type CH0 mA CH1 mA	Measures Power-Up Safe 0.000 Write 0.000 Write 0.000 0.000 Write 0.000 Write 0.000	Digital inputs Fall Latch Clear Fall Latch Write	Name 3012 Write FW vers. D470 WDT(x0.5 e) 10 Write Reset all counters Delay(x1 ms) 1 Write	
			0 000 Wdt_en Wdt_ev Pup_ev 1 000 2 000 3 000	
		Digital outputs 🛛 🗎 🙎	Power-Up Safe 00 Write 00 Write	

Providing a 4-20 mA output from the DAT3012 Modbus IO Module.

- 1. Under the measure label type 20 for 20 mA output.
- 2. Click write.
- 3. On Terminal D and E you should be able to read 20 mA with a multimeter.
- 4. On terminal G and E you will be able to measure 20mA if you connect in series a 24 Vdc power supply.
- 5. Type 4mA to measure 4 mA on the output.
- 6. Type in any other number between 0 and 20mA and to check the entire mA output range.

O DAT	3012		T LI LI LI			
	DAT3012 - Slave	485, 2 AIN, 2 AO, 4 DI, 3	Address to connect DO, 2 OUT AN	1 Read data (Single poll)	Continuous Read	Stop on Error
CH0 CH1	Input type Pt100 Vite Pt100 Th the an	Measures 22.8 852.0 is is the setting of e output enter 20 mA d click write.		Digital inputs Digital inputs Rise latch Digital inputs Rise latch Digital 2 3	Counters 0 0 1 0 2 0 3 0	Comm. parameters Address 1 Baud-rate 38400 Parity None N" Bit 8 Stop 1 Mode RTU Q010 Write
CH0 CH1	Output type mA ▼ mA ▼	Measures 20.000 Write 0.000 Write	Power-Up Safe 0.000 Write 0.000 Write 0.000 Write 0.000 Write	Digital inputs Fall Latch Clear Fall Latch	Reset al counters Dig. In Frequency 0 0.00 1 0.00 2 0.00	Name 3012 Write FW vers. D470 WDT(k0.5 s) 10 Write Delay(x1 ms) 1 Write Wdt_en Wdt_ev Pup_ev
				Digital outputs 🛛 🔳 🗷	3 0.00 Power-L 00	Jp Safe Write 00 Write

Checking the relay output operation of the DAT3012 Modbus RTU Analog and Digital IO Slave module.

- 1. Measure the resistance across relay output terminals K and L. It should be open circuit.
- 2. Click the 0 tab inside the box next to the Digital Output label.
- 3. You should be able to hear the relay operation and measure the low resistance across the Modbus relay output Slave terminals K and L, relay out 0.

Address to connect Read data (Single pol) Continuous Read Stop on Emr Digital inputs CHI P100 • Mite 28 CHI P100 • Mite 228 CHI P100 • Mite 2000 Wite 0000 Mite 0000 Mite <th>DAT3012</th> <th>TUTT</th> <th></th> <th></th> <th></th>	DAT3012	TUTT			
Imput type Measures Digital inputs Cements Cem	DAT3012 - Slave 485, 2 Al	Address to connect IN, 2 AO, 4 DI, 3 DO, 2 OUT AN	1 Read data (Single poll)	Continuous Read	Stop on Error
Output type Measures Power-Up Safe Digital inputs Fall Latch Citer Fal Latch Name 3012 Write CH0 mA 20.000 Write 0.000 Write 0.000 Write 0 Write PW vers. 0.470 CH1 mA 0.000 Write 0.000 Write 0.000 Write Write 0.000	Input type Measuremain CH0 P1100 Write 22.8 CH1 P1100 852.0	ures	Digital inputs Digital inputs Rise latch Digital inputs Rise latch Digital inputs Rise latch	Counters 0 0 1 0 2 0 3 0	Comm.parameters Address 1 Winte Baud-rate 38400 - Party None - N° Bit 8 - Stop 1 - Mode RTU - Winte
Click inside the box label 0 to active the relay Digital outputs	Output type Measure CH0 mA 20.000 CH1 mA 0.000	ares Power-Up Safe 0 Write 0.000 Write 0.000 Write Write 0.000 Write 0.000 Write Write	Digital inputs Fall Latch Clear Fall Latch	Reset all counters Dig. In Frequency	Name 3012 Write FW vers. D470 WDT(x0.5 s) 10 Write Delay(x1 ms) 1 Write
Digital outputs Power-Up Safe 00 Write 00 Write		Г	Click inside the box label 0 to active the relay	0 0.00 1 0.00 2 0.00 3 0.00	Wat_en Wat_ev Pup_ev
			Digital outputs 📕 1 🛛	Power-U 00	P Safe Write 00 Write

Explanation of Communication parameters for Modbus Slave DAT3024.

Address

The actual address of the DAT3012 connected.

Baud rate The actual baud rate of the DAT3012 connected.

Parity The actual parity mode of the DAT3012 connected.

N°Bit The actual number of bit selection of the DAT3012 connected.

Mode The actual Modbus modality (RTU or ASCII) set for the DAT3012 connected.

Name The string read from the DAT3012 of 4 ASCII characters used to name it example DAT3012.

FW Vers The firmware version read from the DAT3012.

WTD (x0.5) The watchdog time read from the DAT3012 is in steps of 0.5 seconds.

Delay (x1 ms) The delay time between the reception of a query and transmission of the response. Expressed in steps of 1 millisecond.

Button Wdt_en Indicates if the bit to enable the watchdog time of the device has been set: red indicates the bit is set, grey indicates the bit is not set.

Button Wdt_ev Indicates if the watchdog timer event has occurred: red if the event occurs, grey if the event has not occurred. This condition is also signaled by the blinking of the led "PWR" of the device and the safe state of the digital outputs.

Button Pup_ev Indicates if the Power up event has occurred: red if the event has occurred, grey if the event has not occurred. This condition is also signaled by the power-up state of the digital outputs.

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