Jetter

System DELTA   150699

Programming reference

DELTA PID controller module

Register

Description of the register pattern:

1xyzzz   **x** specifies the module port, where the DELTA PID controller module is located.
x = Slot (2 ... 8)
y specifies the controller #:
y = Controller # (1 ... 4)
zzz specifies the register # itself
0 .. 999

1xy000	Status register		
	Bit 0	Controller 1	0=OFF 1=ON
	Bit 1	Controller 2	0=OFF 1=ON
	Bit 2	Controller 3	0=OFF 1=ON
	Bit 3	Controller 4	0=OFF 1=ON
	Bit 4	Output # 1 and 2	0=ana 1=PWM
	Bit 5	Output # 3 and 4	0=ana 1=PWM

|	Bit 7	Controller 1: 1=Current < 2 mA at 4-20mA Current interface ON
	Bit 8	Controller 2: 1=Current < 2 mA at 4-20mA Current interface ON
	Bit 9	Controller 3: 1=Current < 2 mA at 4-20mA Current interface ON
	Bit 10	Controller 4: 1=Current < 2 mA at 4-20mA Current interface ON
1xy001	Command register	
	1	Switch controller ON
	2	Switch controller OFF
	3	Clear I-component
	4	PWM+ ON
	5	PWM+ OFF
	6	PWM- ON
	7	PWM- OFF
	12	Controller OFF (keeping the manipulated variable)
1x1001	35	Activation of PWM outputs on controller # 1 and 2
	36	Deactivation of PWM outputs on controller # 1 and 2
	37	Activation of PWM outputs on controller # 3 and 4
	38	Deactivation of PWM outputs on controller # 3 and 4

1xy002   Setpoint (normalized, scaled)
Value range: -1000 ... +1000
1xy003   P gain
Value range: 0 ... 131072
1xy004   Integral-action time T_N (I-component)
Value range: 1 ... 1000000
1xy005   Derivative action time T_V (D-component)
Value range: -8388608 ... +8388607
1xy006   Sampling interval
Value range: 1 ... 255
1xy007   Integral action limitation
Value range: 0 ... 32767
1xy008   Slew Rate limitation
Value range: 1 ... 2000
1xy010   Period of the PWM signal
Value range: 0 ... 65535
1xy011   Assignment Input-Controller
Value range: 1 ... 8
1xy012   Assignment Output-Controller

Value range: 1 ... 4
1xy017   Output value DAC, direct
Value range: -32768 ... +32767
1xy018   Present I-component
Value range: -32768 ... +32767
1xy019   Manipulated value (normalized, scaled)
Value range: -1000 ... +1000
1xy020   Threshold- Activation of the controller
Value range: -32768 ... +32767
1x1023   Quantity of activable controllers
Value range: 1 ... 4
1x1041   Actual value AD input channel # 1 normalized, scaled)
Signal IN1 or (IN1A - IN1B)
1x1042   Actual value AD input channel # 2 (normalized, scaled)
Signal IN2 or (IN2A - IN2B)
1x1043   Actual value AD input channel # 3 (normalized, scaled)
Signal IN3 or (IN3A - IN3B)
1x1044   Actual value AD input channel # 4 (normalized, scaled)
Signal IN4 or (IN4A - IN4B)
1x1045   Actual value AD input channel # 5 (normalized, scaled)
Signal IN5 or (IN1A - IN1B)
1x1046   Actual value AD input channel # 6 normalized, scaled)
Signal IN6 or (IN2A - IN2B)
1x1047   Actual value AD input channel # 7 (normalized, scaled)
Signal IN7 or (IN3A - IN3B)
1x1048   Actual value AD input channel # 8 normalized, scaled)
Signal IN8 or (IN4A - IN4B)
Value range - AD conversion setpoint (normalized): -1000 ... +1000
1x1051   Direct actual value - ADC channel # 1
Signal IN1 or (IN1A - IN1B)
1x1052   Direct actual value - ADC channel # 2
Signal IN2 or (IN2A - IN2B)
1x1053   Direct actual value - ADC channel # 3
Signal IN3 or (IN3A - IN3B)
1x1054   Direct actual value - ADC channel # 4
Signal IN4 or (IN4A - IN4B)
1x1055   Direct actual value - ADC channel # 5

Signal IN5 or (IN1A - IN1B)
1x1056   Direct actual value - ADC channel # 6
        Signal IN6 or (IN2A - IN2B)
1x1057   Direct actual value - ADC channel # 7
        Signal IN7 or (IN3A - IN3B)
1x1058   Direct actual value - ADC channel # 8
        Signal IN8 or (IN4A - IN4B)
        Value range - AD conversion setpoint:
        -32768 ... +32767
1x1061   Configuration of AD channel # 1
1x1062   Configuration of AD channel # 2
1x1063   Configuration of AD channel # 3
1x1064   Configuration of AD channel # 4
1x1065   Configuration of AD channel # 5
1x1066   Configuration of AD channel # 6
1x1067   Configuration of AD channel # 7
1x1068   Configuration of AD channel # 8
        Value range - Configuration of analogue
        channel: 3, 7, 8, 12, 17, 21
1x1071   Scaling of AD input channel # 1 - lower limit
1x1072   Scaling of AD input channel # 2 - lower limiti
1x1073   Scaling of AD input channel # 3 - lower limiti
1x1074   Scaling of AD input channel # 4 - lower limiti
1x1075   Scaling of AD input channel # 5 - lower limiti
1x1076   Scaling of AD input channel # 6 - lower limiti
1x1077   Scaling of AD input channel # 7 - lower limiti
1x1078   Scaling of AD input channel # 8 - lower limiti
        Value range - Lower limit of input scaling:
        -1000 ... +1000
1x1081   Scaling of AD input channel # 1 - upper limit
1x1082   Scaling of AD input channel # 2 - upper limit
1x1083   Scaling of AD input channel # 3 - upper limit
1x1084   Scaling of AD input channel # 4 - upper limit
1x1085   Scaling of AD input channel # 5 - upper limit
1x1086   Scaling of AD input channel # 6 - upper limit
1x1087   Scaling of AD input channel # 7 - upper limit
1x1088   Scaling of AD input channel # 8 - upper limit
        Value range - Upper limit of input scaling:
        -1000 ... +1000
1x1091   Scaling of DA output channel # 1 - lower limit
1x1092   Scaling of DA output channel # 2 - lower limit
1x1093   Scaling of DA output channel # 3 - lower limit
1x1094   Scaling of DA output channel # 4 - lower limit
        Value range - Lower limit of output scaling:
        -1000 ... +1000
1x1095   Scaling of DA output channel # 1 - upper limit

1x1096   Scaling of DA output channel # 2 - upper limit
1x1097   Scaling of DA output channel # 3 - upper limit
1x1098   Scaling of DA output channel # 4 - upper limit
        Value range - Upper limit of output scaling:
        -1000 ... +1000
1x1099   Software version
        Value range: 0 ... 8388607
1x1124   Enabling local access digital outputs (bit-coded)
        Value range: 0 ... 65535
1x1126   Enabling global access dig. outputs (bit-coded)
        Value range: 0 ... 65535
1xy151   Averaging ON / OFF - Analogue channel # 1
1xy152   Averaging ON / OFF - Analogue channel # 2
1xy153   Averaging ON / OFF - Analogue channel # 3
1xy154   Averaging ON / OFF - Analogue channel # 4
1xy155   Averaging ON / OFF - Analogue channel # 5
1xy156   Averaging ON / OFF - Analogue channel # 6
1xy157   Averaging ON / OFF - Analogue channel # 7
1xy158   Averaging ON / OFF - Analogue channel # 8
        0   Averaging OFF
        1 ... 32767: Range of values to be averaged
                    - 1 through 32767
1xy199   Recognised submodule type
        y=Submodule port # (1 ... 3)
        Value range: 1 ... 7

Power supply

Pin Assignment
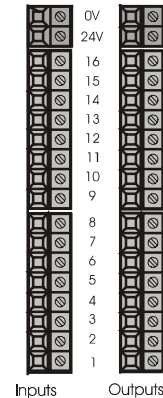
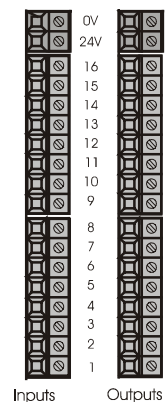Inputs   Outputs

Lefthand terminal strip (inputs)

Connection	Signal	Comment
0V	GND	
24V	24 V DC	Power supply of DELTA PID controller module

Righthand terminal strip (outputs)

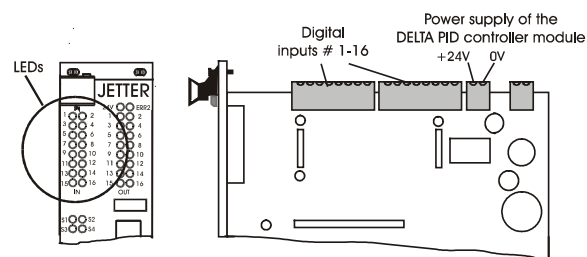| Connection	Signal	Comment
0V	GND	
24V	24 V DC	Power supply of digital outputs

Digital inputs and outputs
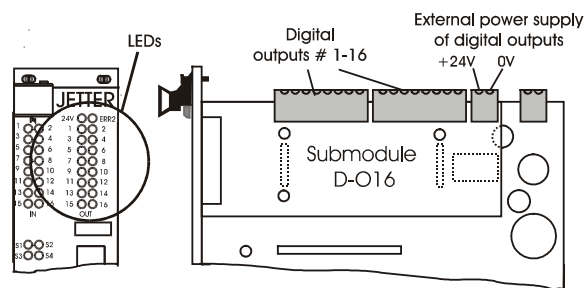
Pin Assignment

Inputs   Outputs

The digital inputs are located on the left-hand side, the digital outputs on the right-hand side.
The digital inputs and outputs are numbered from 1 through 16.

Description of LEDs

IN 1 ... 16   Digital input 1 to 16
         on: Signal voltage IN
         off: Signal voltage OUT

OUT 1 ... 16   Digital output 1 to 16
         on: Signal voltage IN
         off: Signal voltage OUT
ERR2   Malfunctions
         on: Overload, overtemperature, cable breakage of one or more outputs
24V   Power supply of the digital output
         on: Operating voltage is OK.

PWM outputs

Controller	Signal	Output D-O16
1	PWM+	1
1	PWM-	2
2	PWM+	3
2	PWM-	4
3	PWM+	5
3	PWM-	6
4	PWM+	7
4	PWM-	8

D-AD8 (analogue input)

Configuration of AD channel

		Register value
single-ended	-20 ... +20 mA	3
	4 ... +20 mA	17
	-10 ... +10 V	8
Differential	-20 ... +20 mA	7
	4 ... +20 mA	21
	-10 ... +10 V	12

Jumper Settings

| Allocation of current channels to the female Sub-D connector, 15 pins		
The following jumpers have to be inserted		
Current channel # 1	single-ended	X4.1-2 and X6
	Differential	X4.1-2 and X4.9-10
Current channel # 2	single-ended	X4.3-4 and X7
	Differential	X4.3-4 and X4.11-12
Current channel # 3	single-ended	X4.5-6 and X8
	Differential	X4.5-6 and X4.13-14
Current channel # 4	single-ended	X4.7-8 and X9
	Differential	X4.7-8 and X4.15-16

Note!

With the DELTA PID controller module the current channels are not allocated to the female Sub-D connector, 15 pins. Therefore, it is not required to set any jumpers.

Description of Connections

### Analogue inputs - Voltage

Female connector SUB-D, 15 pins
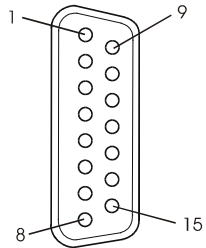
Pin	Signal		Comment
	single-ended	Differential	
1	GND		Ground
2	IN1	IN1 A	Voltage input 1
3	IN2	IN2 A	Voltage input 2
4	IN3	IN3 A	Voltage input 3
5	IN4	IN4 A	Voltage input 4
6	IN5	IN1 B	Voltage input 5
7	IN6	IN2 B	Voltage input 6
8	IN7	IN3 B	Voltage input 7
9	IN8	IN4 B	Voltage input 8
10	not assigned		
11	+15V		Loadability: 5 mA
12	-15V		Loadability: 5 mA
13	GND		Ground
14	not assigned		
15	not assigned		

Attention!

Do not connect any voltage sources to pin 1, 11, 12 and 13.
This will result in damages to the product.

Analogue inputs - Current

Female connector SUB-D, 9 pins
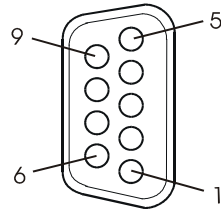
Pin	Signal	Comment
	Differential	
1	GND	Ground
2	IN4 B	Current input 1
3	IN3 B	Current input 2
4	IN2 B	Current input 3
5	IN1 B	Current input 4
6	IN4 A	Current input 5
7	IN3 A	Current input 6
8	IN2 A	Current input 7
9	IN1 A	Current input 8

The differential current channel can be converted to a single-ended current channel by connecting pins 2, 3, 4 resp. 5 to GND.

D-DA4 (analogue output)

Description of Connections

Analogue outputs - Female connector SUB-D, -15 pins
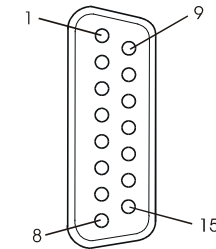
Pin	Signal	Comment
1	GND	Ground
2	not assigned	
3	IOUT4	Current output - Channel # 4
4	IOUT3	Current output - Channel # 3
5	IOUT2	Current output - Channel # 2
6	IOUT1	Current output - Channel # 1
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground
11	VOUT4	Voltage output - chan. # 4
12	VOUT3	Voltage output - chan. # 3
13	VOUT2	Voltage output - chan. # 2
14	VOUT1	Voltage output - han. # 1
15	not assigned	

All voltage and current outputs are provided with GND reference!