

Modicon Quantum automation platform

Discrete I/O

General

The Module Quantum Automation Series supports a full range of discrete I/O modules designed to interface with a wide variety of field devices. All modules meet internationally accepted IEC electrical standards that ensure reliability in harsh operating environments. For even better protection and extended life in extremely harsh environments, you can have your modules conformally coated.

Fully software-configurable

All Quantum I/O modules can be completely configured using Unity Pro, Concept or ProWORX. The ability to specify an I/O address for each module in software makes it easy to add or change modules in your configuration without physically changing the application program.

Defining the failure mode of an output module

Quantum gives you the ability to predefine how a discrete output point will respond if for any reason the module stops being serviced. You can configure the module in software so that the outputs:

- Turn off.
- Go to a predefined safe state.
- Hold the last value they received before the watchdog timer expired.

Failure modes can be defined on a point-by-point basis. In the event of a complete module failure, the fail state settings you have specified can be sent to the replacement module.

Mechanical keying for added security

Optionally, you can insert mechanical keys between the I/O module and the terminal strip to ensure that the field wiring and the module type are properly matched. Keying codes are unique for each module type. You can also implement mechanical keying for unique slot locations so that a rack full of similar modules with similar keying codes will not be incorrectly connected. Keys are shipped with the I/O modules. They do not need to be ordered separately.

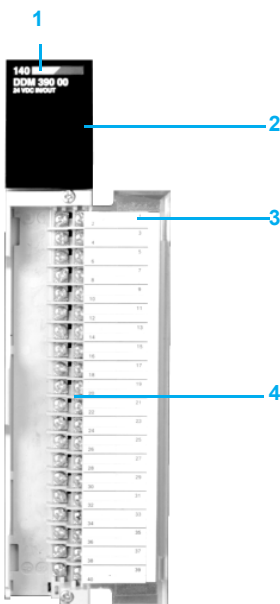
I/O connectors

Each I/O module requires an I/O connector (P/N 140 XTS 002 00), which has to be ordered separately. The same connector can be used with all modules, except for Intrinsically safe modules.

Description

140 D●● discrete I/O comprise on the front panel:

- 1 A model number and color code,
- 2 A LED indicator panel,
- 3 A removable, hinged door and customer identification label,
- 4 A 140 XTS 002 00 terminal block, 40-pole (to be ordered separately).



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Visual status and diagnostic information

Extensive LED information is available on each module. Information includes activity on the I/O points and specific module features such as field wiring fault indication and blown fuses. Visual indication of communication health is provided on an Active display, which can be used for troubleshooting.

32-point discrete I/O modules

	Active		F	
1	9	17	25	
2	10	18	26	
3	11	19	27	
4	12	20	28	
5	13	21	29	
6	14	22	30	
7	15	23	31	
8	16	24	32	

LED	Color	Indication when on
Active	green	Bus communication is present
F	red	External fault detected
1...32	green	The respective input/output is turned on

16-Point discrete I/O modules

	Active		F	
1	9	1	9	
2	10	2	10	
3	11	3	11	
4	12	4	12	
5	13	5	13	
6	14	6	14	
7	15	7	15	
8	16	8	16	

LED	Color	Indication when on
Active	green	Bus communication is present been detected
F	red	A fault (external to the module) has been detected
1...16	green	The indicated point or channel is turned on
1...16	red	There is a fault on the indicated point or channel

Discrete Bi-directional modules

	Active		F	
1	1		1	
2	2		2	
			3	
			4	

LED	Color	Indication when on
Active	green	Bus communication is present
F	red	No voltage supply for outputs or inputs out of tolerance
1 and 2 left row	green	Output is turned on
1 and 2 middle row	red	Fault detected on the output point
1...4 right row	red	Fault detected on the input point

Characteristics							
V a.c. input module characteristics							
Model		140 DAI 540 00	140 DAI 543 00	140 DAI 553 00	140 DAI 740 00	140 DAI 753 00	
Number of inputs		16		32	16	32	
Number of groups		16	2	4	16	4	
Inputs/group		1	8	8	1	8	
Input voltage		~ V	115		230		
LEDs		Active	1...16 (green)	Active	1...32 (green)	Active	1...16 (green)
Addressing requirements		words	1 input	2 inputs	1 input	2 inputs	
Operating input	50 Hz	On	~ V	85...132		175...264	
		Off	~ V	0...20		0...40	
		Current	mA	11.1 max.		9.7 max.	
		Impedance	kΩ	14.4 capacitive		31.8 capacitive	32
	60 Hz	On	~ V	79...132		165...264	165...264
		Off	~ V	0...20		0...40	
		Current	mA	13.2 max.		11.5 max.	
		Impedance	kΩ	12 capacitive		26.5 capacitive	27
Frequency range		Hz	47...63				
Maximum leakage current		mA	2.1		2.6		
Absolute maximum input	Continuous	~ V	132		264		
	10 s	~ V	156		300	312	
	One cycle	~ V	200		400		
Response time	Off - on	Minimum	ms	4.9			
		Maximum	ms	0.75 x line cycle			
	Off - on	Minimum	ms	7.3			
		Maximum	ms	12.3			
Isolation		~ V	1780 for 1 minute input-to-input 1780 for 1 minute input-to-bus	1780 for 1 minute group-to-group 1780 for 1 minute group-to-bus	1780 for 1 minute input-to-input 1780 for 1 minute input-to-bus	1780 for 1 minute group-to-group 1780 for 1 minute group-to-bus	
Bus current requirement		mA	180	250	180	250	
Power dissipation		W	5.5 max.	10.9 max.	5.5 max.	5 max.	
Fusing	Internal		-				
	External		User discretion				
Agency approvals			UL 508, CSA 22.2-142, Cc, FM Class1 Div. 2, c UL		UL 508, CSA 22.2-142, Cc, FM class1 Div. 2 (pending), c UL		

Characteristics (continued)				
V d.c. input module characteristics				
Model			140 DDI 364 00	140 DSI 353 00
Number of inputs			96	32
Number of groups			6	4
Points/group			16	8
Input voltage		$\ddot{=}$ V	24	
LEDs			Active 1...32, 23...64, 65...96 (green) indicates input state	Active (2 green), Failure (1 red) 1...32 (green) indicates input state
Addressing requirements			96 points or 6 words	4 input words
Voltage	On voltage	$\ddot{=}$ V	+ 15...+ 30	11 min.
	Off voltage	$\ddot{=}$ V	+ 5	5 max.
	On current	mA	2.5 min.	2.5 min.
	Off current	mA	0.7 max.	1.2 max., 0.3 min.
Absolute maximum input	Continuous	$\ddot{=}$ V	30	
	Surge	$\ddot{=}$ V	50, dropping pulse	45 for 10 ms @ - 3...30
Response time	Off - On	ms	2 max.	2.2
	On - Off	ms	3 max.	3.3
Fault sensing			–	Broken wire detection below 0.15 mA Off current
Fault status			–	Broken wire detection for each input
Internal resistance		Ω	6.7	–
Isolation	Point to point		–	No
	Inputs to backplane	\sim V (rms)	–	Yes, 1780 for 1 minute, group to bus
	Group to group	\sim V (rms)	500 for 1 minute	Yes, 500 for 1 minute
Operating temperature		$^{\circ}$ C ($^{\circ}$ F)	–	0...60 (32...140)
Bus current requirement		mA	< 270	250
Power dissipation		W	1.35 + (0.13 x nbr of ON inputs)	–
External power supply		\sim V	19.2...30	20...30 @ 20 mA per group
Agency approvals			–	UL 508, CSA 22.2-142, C€, FM Class1 Div. 2 (pending), c UL

Characteristics (continued)							
V d.c. input module characteristics							
Model		140 DDI 841 00	140 DDI 853 00	140 DDI 853 00	140 DDI 673 00	140 DDI 673 00	
Number of inputs		16	32	32	24	24	
Number of groups		8	4	4	3	3	
Points/group		2	8	8			
Input voltage	$\overline{\text{V}}$	10...60			88...150		
LEDs		Active 1...16 (green)	Active 1...32 (green)	Active 1...32 (green)	Active 1...24 (green)	Active 1...24 (green)	
Addressing requirements		1 input word	2 input words	2 input words			
On state current	$\overline{\text{V}}$ 12 V	mA	5...10			2.5 min. @ c 125 V	
	$\overline{\text{V}}$ 24 V	mA	6...30				
	$\overline{\text{V}}$ 48 V	mA	2...15				
	$\overline{\text{V}}$ 60 V	mA	1...5				
Group supply/tolerance	$\overline{\text{V}}$ 12 V / + / - 5 %	V	on state 9...12	off state 0...1.8	on state 9...12	off state 0...1.8	–
	$\overline{\text{V}}$ 24 V / - 15...+ 20 %	V	11...24	0...5	11...24	0...5	–
	$\overline{\text{V}}$ 48 V / - 15...+ 20 %	V	34...48	0...10	34...48	0...10	–
	$\overline{\text{V}}$ 60 V / - 15...+ 20 %	V	45...60	0...9	45...60	0...12.5	–
Absolute maximum input		V	$\overline{\text{V}}$ 75			~ 156.25 including ripple	
Response time	Off - on	ms	4			0.7 (defaults filter) 1.5 (optional filter)	
	On - off	ms	4			0.7 (defaults filter) 1.5 (optional filter)	
Switching frequency		Hz	100 max.			–	
Isolation	Group-to-group	V (rms)	$\overline{\text{V}}$ 700 for 1 minute			~ 1780 for 1 minute	
	Group-to-bus	V	2500 for 1 minute				
Bus current requirement		mA	200	300		200	
Power dissipation		W	1 + (0.62 x # of points on)				
External power (U _s)		$\overline{\text{V}}$	10...60 (group supply), not required for this module				
Fusing	Internal		–				
	External		User discretion				
Logic			Sink				
Agency approvals			UL 508, CSA 22.2-142, Cc, FM Class1 Div. 2, c UL				

Characteristics (continued)						
V a.c. input module characteristics						
Model		140 DAI 340 00	140 DAI 353 00	140 DAI 440 00	140 DAI 453 00	
Number of inputs		16	32	16	32	
Number of groups		16	4	16	4	
Points/group		1	8	1	8	
Input voltage		~ V	24	24	48	
LEDs		Active 1...16 (green)	Active 1...32 (green)	Active 1...16 (green)	Active 1...32 (green)	
Addressing requirements		words	1 input	2 inputs	1 input	2 inputs
Operating input	50 Hz	On	~ V	14...30	34...56	
		Off	V	0...5	0...10	
		Current	mA	11.1 max.	9.8 max.	
		Impedance	kΩ	3.1 capacitive	6.8 capacitive	
	60 Hz	On	~ V	12...30	29...56	
		Off	V	0...5	0...10	
		Current	mA	13.2 max.	11.7 max.	
		Impedance	kΩ	2.6 capacitive	5.6 capacitive	
Frequency range		Hz	47...63			
Maximum leakage current		mA	1.9	1.7		
Absolute maximum input	Continuous	~ V	30	56		
		V	32	63		
		V	50	100		
Response time	Off - On	Minimum	ms	4.9		
		Maximum	ms	0.75 x line cycle		
	On - Off	Minimum	ms	7.3		
		Maximum	ms	12.3		
Isolation		~ V	1780 for 1 minute input-to-input 1780 for 1 minute input-to-bus	1780 for 1 minute group-to-group 1780 for 1 minute group-to-bus	1780 for 1 minute input-to-input 1780 for 1 minute input-to-bus	1780 for 1 minute group-to-group 1780 for 1 minute group-to-bus
Bus current requirement		mA	180	250	180	250
Power dissipation		W	5.5 max.	10.9 max.	5.5 max.	10.9 max.
Fusing	Internal		-			
	External		User discretion			
Agency approvals			UL 508, CSA 22.2-142, CE, FM Class1 Div. 2, c UL			

Characteristics (continued)				
V d.c. input module characteristics				
Model		140 DDI 153 10	140 DDI 353 00	140 DDI 353 10
Number of inputs		32		
Number of groups		4		
Points/group		8		
Input voltage		$\overline{\text{V}}$ 5 TTL	24	
LEDs		Active 1...32 (green) - indicates point status		
Addressing requirements		2 input words		
Operating input	Voltage on	$\overline{\text{V}}$ 0.8	15...30	- 15...- 30 (reference from group supply)
	Voltage off	V 4 min. @ $U_s = 5.5 \text{ V}$	- 3...+ 5	0...- 5 (reference from group supply)
	Current on	mA 4.0 @ $U_s = 5.5 \text{ V}$ and $U_m = 0$	2.0 min.	2.5 min. @ $U = - 14 \text{ V}$
	Current off	mA -	0.5 max.	
Internal resistance		$\text{k}\Omega$ 7.5	2.5	2.4
Leakage current		mA 200 @ $U_s = 5.5 \text{ V}$ and $U_m = 4 \text{ V}$		
Absolute maximum input	Continuous	$\overline{\text{V}}$ 5.5	30	
	1.0 ms	V -	50 (decaying pulse)	
	1.3 ms	V 15 (decaying pulse)	56 (decaying pulse)	-
Response time	Off - on	ms 250 max.	1000 max.	
	On - off	ms 500 max.	1000 max.	
Input protection		Resistor limited		
Isolation	Group-to-group	$\overline{\text{V}}$ V (rms) 500 for 1 minute		
	Group-to-bus	V (rms) 1780 for 1 minute		
Bus current requirement		mA 170	330	
Power dissipation		W 5	1.7 + (0.36 x # of points on)	1.5 + (0.26 x # of points on)
External power (U _e)		$\overline{\text{V}}$ 4.5...5.5	-	19.2...30
Fusing	Internal	-		
	External	User discretion		
Logic		Source	Sink	Source
Agency approvals		UL 508, CSA 22.2-142, Cc, FM Class1 Div. 2, c UL		

Characteristics (continued)							
V a.c. output module characteristics							
Model		140 DAO 840 00	140 DAO 842 10	140 DAO 842 20	140 DAO 853 00		
Number of outputs		16	16		32		
Number of groups		16	4				
Points/group		1	4		8		
Voltage (rms)	Working	~ V	20...253	85...253	20...56	20...253	
	Frequency	Hz	47...63				
	On state drop/point	~ V	1.5				
LEDs		Active 1...16 (green) - indicates point status	Active F 1...16 (green) - indicates points status 1 - 4, 5 - 8, 9 - 12, 13 - 16 (red) - indicates group blew a fuse or no field power		Active 1...32 (green) - indicates point status		
Addressing requirements			1 output word			2 outputs words	
Operating output (rms)	Working	~ V	20...253	85...253	20...56	–	
	On state drop/point		1.5			–	
Frequency range		Hz	47...63				
Absolute maximum output		~ V	300 for 10 s 400 for 1 cycle		63 for 10 s 100 for 1 cycle 111 peak for 1.3 ms	300 for 10 s 400 for 1 cycle	
Minimum load current (rms)		mA	5			10	
Maximum load current (rms)	Per point	A	4 continuous, 20...132 V 3 continuous, 170...253 V	4 continuous, 85...132 V 3 continuous, 170...253 V	4 continuous, 20...56 V	1 continuous, 20...253 V	
	Four contiguous points	A	4 continuous	–			
	Per group	A	–	4 continuous			
	Per module	A	16 continuous				
	Off state leakage/ point (max)	mA	2.5 @ 230 V 2.0 @ 115 V 1.0 @ 48 V 1.0 @ 24 V	2.5 @ 230 V 2.0 @ 115 V	1.0	2 @ 230 V 1.1 @ 115 V 0.4 @ 48 V 0.2 @ 24 V	
Maximum surge current (rms)	One cycle	A	Per point 30	Per point 30	Per group 45	Per point 15	
	Two cycles	A	20	20	30	30	12
	Three cycles	A	10	10	25	25	8
Applied DV/DT		~	400 V/ms				
Response time	Off - on	ms	.50 max. of one line cycle				
	On - off	ms	.50 max. of one line cycle				
Output protection (internal)			RC snubber suppression				
Isolation (rms)	Group-to-group	~ V	–	1000 for 1 minute, galvanically isolated	1780 for 1 minute		
	Output-to-output	~ V	1500 for 1 minute	–			
	Output-to-bus	~ V	1780 for 1 minute				
Fault detection			–	Blown fuse detect, loss of field power	–		
Bus current requirement		mA	350			320	
Power dissipation		W	1.85 + (1.1 V x total module load current)			1.60 + (1.0 V x total module load current)	
External power (rms)		~ V	–	85...253	20...56	–	
Fusing	Internal		–	5 A fuse for each group		4 A, 250 V for each group	
	External		5 A/point recommended (part # 043502405 or equivalent)	User discretion			
Agency approvals			UL 508, CSA 22.2-142, CE, FM Class1 Div. 2, c UL				

Characteristics (continued)			
V a.c. and TTL output module characteristics			
Model		140 DAO 840 10	140 DDO 153 10
Number of outputs		16 isolated	32 (four groups of 8)
LEDs		Active 1...16 (green) - indicates point status	Active F 1...32 (green) - indicates point status
Addressing requirements		1 output word	2 output words
Voltage (rms)	Working	V	~ 20...132
	Absolute maximum	~	156 for 10 s 200 for 1 cycle
	Frequency	Hz	47...63
	On state drop/point	~ V	1.5
Output ratings	On level	~ V	-
	Off level	---	-
Internal pullup resistor		Ω	-
Minimum load current (rms)		mA	5
Maximum load current (rms)	Each point	mA	4 continuous, 20...132 V
	Each group	mA	-
	Any 4 contiguous pts	A	4 max. continuous for the sum of the four points
	Per module	A	16 continuous
	Off state leakage/points	mA	2 @ 115 V max. 1 @ 48 V max. 1 @ 24 V max.
Surge current maximum (rms)			Per point
	One cycle	A	30
	Two cycles	A	20
	Three cycles	A	10
	Each point	mA	-
Applied DV/DT		~	400 V/μs
Response time	Off - on		0.50 of one line cycle max.
	On - off		0.50 of one line cycle max.
Output protection (internal)			RC snubber suppression, varistor
Isolation (rms)	Output-to-output	~ V	1500 for 1 minute
	Group-to-group	~ V	-
	Output-to-bus	~ V	1780 for 1 minute
Fault detection			-
Bus current required		mA	350
Power dissipation		W	1.85 + 1.1 x total module load current
External power (U _s)		--- V	-
Absolute voltage (U _s) max		--- V	-
External power supply current		mA	-
Fusing	Internal		-
	External		Each output point must be fused with an external fuse. The recommended fuse is a 5 A fuse or any other fuse with an I ² t rating of less than 87
Agency approvals			UL 508, CSA 22.2-142, CE, FM Class1 Div. 2, c UL

Characteristics (continued)					
V d.c. output module characteristics					
Model			140 DDO 364 00	140 DDO 885 00	140 DVO 853 00
Number of outputs			96	12	32
Number of groups			6	2	4
Points/group			16	6	8
LEDs			Active 32...64 1...32 (green) - indicates output state	Active Failure 1 red 1...12 (green) - indicates point or channel is On 1...12 (red) - indicates output point has an over-current condition	Active (1 green) Failure 1 red 1...32 (green) - indicates output state
Addressing requirements			96 points or 6 output words	1 output word and 1 input word	2 input words and 2 output words
Voltage	Output	$\overline{\text{V}}$	–	24...125	10...30
	Absolute (max.)	$\overline{\text{V}}$	–	–	50 for 1.0 ms decaying voltage pulse
	Working	$\overline{\text{V}}$	–	19.2...156.2 including ripple	–
	On state drop/point	$\overline{\text{V}}$	< 0.5 @ 0.5 A	0.75 @ 0.5 A	0.4 @ 0.5 A
Maximum load current	Each point	A	0.5	0.75 @ < 40 °C	0.5
	Each group	A	3.2	3.0 @ 0...60 °C	4.0
	Per module	A	19.2	6.0 @ 0...60 °C	16.0
Surge current maximum	Each point	A	2 (internally limited)	4 @ 1 ms pulse (no more than 6 per minute)	2.5 @ 1 ms pulse (no more than 6 per minute)
Response time (resistive loads)	Off - on	ms	< 0.1	1	1 typical, 2 max
	On - off	ms	< 0.1	1	1 typical, 2 max
Type of output			Electronic, protected against short circuit and overheating	–	–
Type of signal		$\overline{\text{V}}$	Current source	–	–
Leakage current		mA	1 @ c 24 V	–	–
Output protection (internal)			Thermal overload and short circuit	Group varistor and individual point overcurrent sense	Transient voltage suppression short circuit protection
Load inductance maximum		Henry	0.5 @ 4 Hz switch frequency or: $L = \frac{0.5}{f^2}$ where: L = Load Inductance (Henry) I = Load Current (A) F = Switching Frequency (Hz)	No limit (internal diode protected)	0.5 @ 4 Hz switch frequency or: $L = \frac{0.5}{f^2}$ where: L = Load Inductance (Henry) I = Load Current (A) F = Switching Frequency (Hz)
Tungsten load maximum per point		W	–	46 @ c 130 V	2.5 @ c 10 V
			–	41 @ c 115 V	3 @ c 12 V
			–	8 @ c 24 V	6 @ c 24 V
Switching frequency		Hz	–	50 maximum	–
Isolation	Field-to-bus	\sim	500 for 1 minute	2500 for 1 minute	–
	Group-to-group	V (rms)	–	1200 for 1 minute	500 for 1 minute
	Group-to-bus		–	–	1780 for 1 minute
Fault	Detection		Group indication: loss of field power/faulted point (short circuit or overload)	Over current	Blown fuse, loss of power incorrect output state
	Sensing		Yes	–	–
	Reporting		Yes	–	–
Bus current requirement		mA	< 250	375 (6 points On) 650 (12 points On)	500
External power		$\overline{\text{V}}$	19.2...30	–	10...30
Fusing	Internal		–	4 A	5 A fuse per group
	External		User discretion	–	–
Power dissipation		W	7 (all points on)	1 + (0.77 x # points on)	2.5 + (0.1x # points on) + (0.4 x total load current)
Agency approvals			UL 508, CSA 22.2-142, Cc, FM Class1 Div. 2 (pending), c UL	UL 508, CSA 22.2-142, Cc, FM Class1 Div. 2, c UL	UL 508, CSA 22.2-142, Cc, FM Class1 Div. 2 (pending), c UL

Characteristics (continued)					
V d.c. output module characteristics					
Model		140 DDO 353 00	140 DDO 353 10/ 140 DDO 353 01	140 DDO 843 00	
Number of outputs		32 (4 groups of 8)		16 (2 groups of 8)	
LEDs		Active F 1...32 (green) - indicates point status		Active 1...16 (green) - indicates point status	
Addressing requirements		2 output words		1 output word	
Voltage	Operating (max)	$\overline{\text{V}}$	19.2...30	10.2...72	
	Absolute (max)	$\overline{\text{V}}$	56 for 1.3 ms decaying voltage pulse	72 (continuous)	
	1.0 ms	$\overline{\text{V}}$	–	50 decaying pulse	
	on state drop/point	$\overline{\text{V}}$	0.4 @ 0.5 A	1 max. @ 2 A	
Maximum load current	Each point	A	0.5	2	
	Each group	A	4	6	
	Per module	A	16	12	
	Off state leakage/point	mA	0.4 @ 30 V	DDO 353 10: 0.4...30 VDC DDO 353 01: < 1...24 VDC 1 @ 60 V max	
Surge current maximum	Each point	A	5 @ 500 μ s duration (no more than 6 per minute)	DDO 353 10: 5 @ 1 ms duration (no more than 6 per minute). DDO 353 01: 2 (limited internally).	7.5 @ 50 ms duration (no more than 20 per minute)
			Response time (resistive loads)	Off - on	ms
	On - off	ms	1 (max.)	DDO 353 10: < 1 DDO 353 01: < 0.1	1
Output protection (internal)			Transient voltage suppression	DDO 353 10: transient voltage suppression DDO 353 01: Overload and short-circuit-proof through temperature supervision	Over voltage (suppression diode)
Load inductance maximum		Henry	0.5 @ 4 switch frequency or $L = \frac{0.5}{I^2 F}$ where: L = Load Inductance (Henry) I = Load Current (A) F = Switching Frequency (Hz)	–	
Load capacitance maximum		μF	50	–	
Tungsten load maximum		W	–	DDO 353 10: 12 @ 24 V	–
Isolation	Group-to-group	$\overline{\text{V}}$	500 V rms for 1 minute		700 V for 1 minute
	Output-to-bus	$\overline{\text{V}}$	1780 V rms for 1 minute		–
	Group-to-bus	$\overline{\text{V}}$	–		2500 V for 1 minute
Fault detection			Blown fuse detect, loss of field power		–
Bus current requirement		mA	330	330 (max)	160
Power dissipation		W	1.75 + (0.4 V x total module load current)	DDO 353 10: 2.0 + (0.4 V x total load current) DDO 353 01: 5 (all points)	1 + (1 V x total module load current)
External power		$\overline{\text{V}}$	19.2...30 V		10...60 V
Fusing	Internal	A	5 per group		8 per group time-lag
	External	A	5 per group The group fuse is not guaranteed to protect each output switch for all possible overload conditions. 3 A per point recommended		8 per group The group fuse is not guaranteed to protect each output switch for all possible overload conditions. 2 A per point recommended
Logic			Source	DDO 353 10: sink DDO 353 01: source	Source
Agency approvals			UL 508, CSA 22.2-142, C€, FM Class1 Div. 2, c UL	DDO 353 10: UL 508, CSA 22.2-142, C€, FM Class1 Div. 2, c UL. DDO 353 01: UL 508, CSA 22.2-142, C€, FM Class1 Div. 2 (pending), c UL	UL 508, CSA 22.2-142, C€, FM Class1 Div. 2, c UL

Characteristics (continued)				
Relay output module characteristics				
Model		140 DRA 840 00	140 DRC 830 00	
Number of outputs		16 (normally open)	8 (normally open/normally closed pairs)	
LEDs		Active 1...16 (green) - indicates point status	Active 1...8 (green) - indicates point status	
Addressing requirements		1 output word	0.5 output word	
Voltage	Working	\sim V 20...250 $\overline{\text{---}}$ V 5...30 $\overline{\text{---}}$ V 30...150 (reduced load current)		
Maximum load current	Each point	A	2 max., at \sim 250 V or $\overline{\text{---}}$ 30 V @ 60°C ambient resistive load 1 tungsten lamp load 1 @ a power factor of 0.4 1/8 hp @ \sim 125/250 V	5 max., at \sim 250 V, $\overline{\text{---}}$ 30 V @ 60°C ambient resistive load 2 tungsten lamp load 3 @ a power factor of 0.4 1/4 hp @ \sim 125/250 V
	Each point (30...150 V)	$\overline{\text{---}}$ mA	300 (resistive load) 100 (L/R = 10 msec)	300 (resistive) 100 (L/R = 10 msec)
Maximum module current		A	–	40
Minimum load current		mA	50	–
	Per point	A	Note: Minimum load current if the contact is used at rated loads of $\overline{\text{---}}$ 5...30 V or \sim 20...250 V 2 max., at \sim 250 V or $\overline{\text{---}}$ 30 V @ 60°C ambient resistive load	
Maximum frequency (F)		Hz	–	30 resistive loads or $F = \frac{0.5}{I^2 L}$ where: L = Load Inductance (Henry) I = Load Current (A)
Surge current maximum	Per point	A	10 capacitive load @ t = 10 ms	20 capacitive load @ t = 10 ms
Switching capability		VA	500 resistive load	1250 resistive load
Response time (resistive loads)	Off - on	ms	10 (max.)	
	On - off	ms	20 (max.)	
Relay contact life	Mechanical operations		10,000,000	
	Electrical operations		200,000 (resistive load @ max. voltage and current) 100,000 (resistive load @ max. voltage and current)	
	Electrical operations ($\overline{\text{---}}$ 30...150 V)		100,000, 300 mA (resistive load) 50,000, 500 mA (resistive load) 100,000, 100 mA (L/R = 10 msec) 100,000 Interposing relay	
Relay type	Relay type		Form A	Form C, NO / NC contacts
Contact protection			Varistor, 275 V (internal)	
Isolation	Channel-to-channel	V (rms)	\sim 1780 for 1 minute	
	Field-to-bus	V (rms)	\sim 1780 for 1 minute $\overline{\text{---}}$ 2500 for 1 minute	
Bus current requirement		mA	1100	560
Power dissipation		W	5.5 + 0.5 x N = Watts (where N = the number of points on)	2.75 + 0.5 x N = Watts (where N = the number of points on)
External power			–	
Fusing	Internal		–	
	External		User discretion	
Agency approvals			UL 508, CSA 22.2-142, CE, FM Class1 Div. 2, c UL	

Characteristics (continued)							
Combo module characteristics							
Model		140 DAM 590 00	140 DDM 390 00	140 DDM 690 00			
Number of inputs		16 (2 groups of 8)		4 (1 group of 4)			
Number of outputs		8 (2 groups of 4)		4 isolated			
LEDs		Active F (red) - no power applied to the group(s) or blown fuse 1...16 (green - right two columns) - indicates input status 1...8 (green - left column) - indicates output status		Active F (red) - over current condition on any point 1...4 (green - left column) - indicates output point is turned on 1...4 (red - middle column) - indicates output point has an over current condition 1...4 (green - right column) - indicates input point is turned on			
Addressing requirements		1 in/0.5 out word		1 in/1 out word			
Inputs	Operating voltage	On	V	~ 85...132 @ 50 Hz ~ 79...132 @ 60 Hz	--- +15...+30	--- 88 ... 156.2, including ripple	
		Off	V	~ 0...20	--- -3...+5	--- 0 ... +36	
		Impedance	kΩ	14.4 capacitive	2.5	-	
	Current	On	mA	11.1 max. @ 50 Hz 13.2 max. @ 60 Hz	2.0 min.	2.0 min.	
		Off	mA	0.5 max.	0.5 max.	1.2 max.	
	Maximum leakage current from an external device recognized as an off condition		mA	2.1	-	-	
	Absolute maximum input voltage	Continuous	V	~ 132	--- 30	--- 156.2 including ripple	
		10 s	~ V	156	1 max.	-	
		1 cycle	~ V	200	1 max.	-	
		1.3 ms	--- V	-	56 (decaying pulse)	-	
	Response time	Off - on	ms	min. 4.9 / max. 0.75 line cycle	-	0.5 or 1.5 depending on the filter	
		On - off	ms	min. 7.3/ max. 12.3	-	0.5 or 1.5 depending on the filter	
	Outputs	Voltage	Operating (max.)	--- V	-	19.2...30	19.2 ... 156.2 including ripple
			Absolute (max.)	--- V	-	56 for 1.3 ms decaying pulse	-
On state drop/point			--- V	-	0.4 @ 0.5 A	0.75 @ 4 A	
Absolute maximum outputs		Continuous	~ V	85...132	-	-	
		10 s	~ V	156	-	-	
		1 cycle	~ V	200	-	-	
		On state drop/point	~ V	1.5	-	-	
Minimum load current (rms)			mA	5	-	-	
Maximum load current (rms)		Per point	A	4 continuous	0.5	4 continuous	
		Per group	A	4 continuous	2	-	
	Per module	A	8 continuous	4	16 continuous		
Off state leakage/point		mA	2 @ ~ 115 V (max)	0.4 @ --- 30 V	-		
Surge current maximum (rms)	One cycle	A	Per point 30 Per group 45	-	-		
	Two cycles	A	20 30	-	-		
	Three cycles	A	10 25	-	-		
	Per point	A	- -	5 for 500 μs (no more than 6/min)	30 for 500 ms		

Characteristics (continued)					
Combo module characteristics					
Model		140 DAM 590 00	140 DDM 390 00	140 DDM 690 00	
Outputs (continued)					
Load inductance max	Henry	–	0.5 @ 4 Hz switch frequency or $L = \frac{0.5}{I \cdot F}$ where: L = load inductance I = load current (A) F = switching frequency (Hz)	For switching intervals ≥ 15 seconds per ANSI/IEEE C37.90-1978/1989): $L \leq \frac{9}{I \cdot F}$ For repetitive switching: $L \leq \frac{0.7}{I^2 \cdot F}$ where: L = load inductance (Henry) I = load current (A) F = switching frequency (Hz)	
Load capacitance max	μF	–	50	0.1 @ \sim 150 V 0.6 @ \sim 24 V	
Applied DV/DT	V/ μs	400	–		
Output protection		RC snubber suppression (internal)		–	
Common	Frequency	Hz	47 ... 63	–	
I/O response time	On-off	ms	0.5 of 1 cycle max.	1 (max) resistive load output	
	Off-on	ms	0.5 of 1 cycle max.	1 (max) resistive load output	
Module protection	Inputs		–	Resistor-limited	
	Outputs		–	Transient voltage suppression (internal)	
Isolation	Group-to-group	\sim	1000 V for 1 min	500 V rms for 1 min	
	Point-to-bus	\sim	1780 V for 1 min	–	
	Group-to-bus	\sim	–	1780 V for 1 min	2500 V rms for 1 min
	Input group-to-output	\sim	–	–	1780 V rms for 1 min
	Output-to-output	\sim	–	–	1780 V rms for 1 min
Fault detection	Input		–		
	Output		Blown-fuse detect, loss of field power	Over current-each point	
Bus current required	mA	250	330	350	
Power dissipation	W	5.5 + 1.1 x total module load current	1.75 + 0.36 x input points on + 1.1 V x total output load currents	0.4 W x (1.0) x number of input points ON + (0.75) x total module output current	
External power		\sim	85 ... 132 V for output groups	–	
Fusing	Input	Internal	–		
		External		User discretion	
	Output	Internal		5 A fuse for each group	
		External		User discretion	5 A for each group to protect the module from catastrophic failure. Not guaranteed to protect each out-switch for all possible over-load conditions—we recommend that each point be fused with a 1.25 A fuse.
Agency approvals		UL 508, CSA 22.2-142, CÉ, FM Class1 Div. 2, c UL			

Modicon Quantum automation platform

Discrete I/O

References				
Discrete input modules				
Voltage	Description	Logic	Reference	Weight kg (lb)
~ 24 V	16 isolated inputs	–	140 DAI 340 00	0.300 (0.66)
	4 groups of 8 inputs	–	140 DAI 353 00	0.340 (0.75)
~ 48 V	16 isolated inputs	–	140 DAI 440 00	0.300 (0.66)
	4 groups of 8 inputs	–	140 DAI 453 00	0.300 (0.66)
~ 120 V	16 isolated inputs	–	140 DAI 540 00	0.310 (0.68)
	2 groups of 8 inputs	–	140 DAI 543 00	0.300 (0.66)
	4 groups of 8 inputs	–	140 DAI 553 00	0.330 (0.73)
~ 230 V	16 isolated inputs	–	140 DAI 740 00	0.350 (0.77)
	4 groups of 8 inputs	–	140 DAI 753 00	0.300 (0.66)
≡ 5 V TTL	4 groups of 8 inputs	Source	140 DDI 153 10	0.450 (0.99)
≡ 24 V	4 groups of 8 inputs	Sink	140 DDI 353 00	0.300 (0.66)
		Source	140 DDI 353 10	0.300 (0.66)
≡ 24 V	6 groups of 16 inputs	Sink	140 DDI 364 00	0.300 (0.66)
≡ 125 V	3 groups of 8 inputs	Sink	140 DDI 673 00	0.300 (0.66)
≡ 10...60 V	8 groups of 2 inputs	Sink	140 DDI 841 00	0.300 (0.66)
	4 groups of 8 inputs	Sink	140 DDI 853 00	0.295 (0.65)
≡ 24 V	4 groups of 8 inputs	Sink	140 DSI 353 00	0.300 (0.66)
Discrete output modules				
Voltage	Description	Logic	Reference	Weight kg (lb)
~ 24...230 V	16 isolated outputs	–	140 DAO 840 00	0.485 (1.07)
~ 24...115 V	16 isolated outputs	–	140 DAO 840 10	0.485 (1.07)
~ 100...230 V	4 groups of 4 outputs	–	140 DAO 842 10	0.450 (0.99)
~ 24...48 V	4 groups of 4 outputs	–	140 DAO 842 20	0.450 (0.99)
~ 24...230 V	4 groups of 8 outputs	–	140 DAO 853 00	0.450 (0.99)
≡ 5 V TTL	4 groups of 8 outputs	Sink	140 DDO 153 10	0.450 (0.99)
≡ 24 V	4 groups of 8 outputs	Source	140 DDO 353 00	0.450 (0.99)
		Source Protected outputs (1)	140 DDO 353 01	0.450 (0.99)
		Sink	140 DDO 353 10	0.450 (0.99)
≡ 19.2...30V	6 groups of 16 outputs	Source	140 DDO 364 00	0.450 (0.99)
≡ 24...125V	2 groups of 6 outputs	Source	140 DDO 885 00	0.450 (0.99)
≡ 10...60 V	2 groups of 8 outputs	Source	140 DDO 843 00	0.450 (0.99)
≡ 150 V/~ 250V relay	16 relay outputs	“F”	140 DRA 840 00	0.410 (0.90)
	8 relay outputs	“O” and “F”	140 DRC 830 00	0.300 (0.66)
≡ 10...30 V	4 groups of 8 outputs	Source	140 DVO 853 00	0.300 (0.66)

(1) Protected against short-circuits and overloads by thermal supervision.

Modicon Quantum automation platform

Discrete I/O

References (continued)

Discrete combination I/O modules

Number of input/output	Number of input	Number of output	Reference	Weight kg (lb)
24	2 groups of 8 inputs ~ 125 V	2 groups of 4 outputs ~ 125 V	140 DAM 590 00	0.450 (0.99)
	2 groups of 8 inputs (1) ~ 24 V	2 groups of 4 outputs (1) ~ 24 V	140 DDM 390 00	0.300 (0.66)
8	1 group of 4 inputs (1) ~ 125 V	4 isolated outputs (2) ~ 125 V	140 DDM 690 00	0.300 (0.66)

Accessories

Description	Quantity	Reference	Weight kg
Terminal block, 40 points required for all modules (<IP 20 rated)	–	140 XTS 002 00	0.150
Terminal block, 40 points IP 20 – compatible I/O modules.	–	140 XTS 001 00	–
Dummy module without terminal block	–	140 XCP 500 00	–
Dummy module with cover	–	140 XCP 510 00	–
Jumper kit for terminal block	12	140 XCP 600 00	–
Discrete input simulator, 16 switches or the 140 DAI 540 00 and 140 DAI 740 00	–	140 XSM 002 00	–

Connecting cables for I/O modules fitted with HE 10 connectors

Description	Use	Length	Section	Reference	Weight kg
Connecting cables	2 HE 10 connectors or Telefast 2 system	0.5 m	0.324 mm ²	TSX CDP 053	0.085
		1 m	0.324 mm ²	TSX CDP 103	0.150
		2 m	0.324 mm ²	TSX CDP 203	0.280
		3 m	0.324 mm ²	TSX CDP 303	0.410
		5 m	0.324 mm ²	TSX CDP 503	0.670

Separate parts

Description	Quantity	Reference	Weight kg
Coding kit for terminal block	60	140 XCP 200 00	–

(1) Sink

(2) Sink or source.