Electrical Ratings				
Power Circuit	Application	Three-phase		
	Number of Poles	3		
	Input Power Terminals	L1, L2, L3		
	Motor Power Terminals	T1, T2, T3		
	PE (Earth Ground) Terminal	4 PE terminals		
	Maximum Rated Operating Voltage	400Y/230…480Y/277 (-15%, +10%)		
	Rated Impulsed Voltage (U_{imp})	4 kV		
	Dielectric Withstand	**UL**: 1960V AC, **IEC**: 2500V AC		
	Operating Frequency	50/60 Hz (±10%)		
	Maximum Rated Operating Current	**Cat. No.**	**Hp (kW)**	**Overload Range**
		290_-___-A-* 291_-___-A-*	3 (1.5)	0.25…3.5 A
		290_-___-B-* 291_-___-B-*	5 (4)	1.1…7.6 A
	Overload Type	Solid-state I^2T		
	Trip Class	**[10]**, 15, 20 with thermal memory retention (see Motor Overload Trip Curves)		
	Trip Rating — Full Load Current (FLC))	120% of FLC		
	Reset Mode	Automatic or manual		
	Overload Reset Level	1…100% TCU		
	Overvoltage Category	III		
Control Circuit (External Source)	Power Supply	NEC Class 2		
	Rated Operating Voltage	24V DC (+10%, -20%)		
	Overvoltage Protection	Reverse-polarity protected		
	Unswitched Power Supply Requirements	Voltage	19.2…26.4V DC	
		Nominal Current	150 mA	
		Power	3.6 W	
		Input Current (each)★	50 mA	
		Maximum Current	450 mA	
		Maximum Power	11 W	
		Peak Inrush‡	<5 A for 35 ms	
	Switched Power Supply Requirements	Voltage	19.2…26.4V DC	
		Nominal Current	125 mA	
		Power	3 W	
		Output Current (each)★	500 mA	
		Maximum Current	1.625 A	
		Maximum Power	11 W	
		Peak Inrush‡	<5 A for 35 ms	
	Switched and Unswitched Power Supply Requirements	Voltage	19.2…26.4V DC	
		Nominal Current	275 mA	
		Power	6.6 W	
		Number of Inputs (x 50 mA)	user defined	
		Number of Outputs (x 500 mA)	user defined	
		Maximum Current	275 mA + user defined	
		Maximum Power	6.6 W + (24V DC x user defined)	
		Peak Inrush‡	<10 A for 35 ms	
Control Circuit (Internal Source)	An internal 60 W isolated flyback power converter sources input, outputs, and main control board with 24V DC power.			
Short Circuit Current Rating (SCCR)	**Cat. No.**	**Sym. Amps RMS**	**Circuit Breaker**	**Fuse**
	290/1_-*	10 kA @ 480Y/277	When used with Allen-Bradley Cat. No. 140U-D6D3-C30	CC, J, or T fuse (maximum 45 A)
	290/1_-*	5 kA @ 480Y/277	—	UL Class RK5 fuse
	Short Circuit Coordination	Type 1		
		Size per NFPA 70 (NEC) or NFPA 79 for Group Motor Applications		

★ I/O is configurable to either input or output.
‡ Assumes zero wire resistance. Wire impedance will reduce current inrush.

Input and Output Ratings		
Input	Supply Voltage	Unswitched power A3/A2
	Type of Inputs	24V DC current sinking
	Connection Type	Single keyed M12 , quick disconnect
	Input per Connection	1/each
	Rated Operating Voltage	24V DC
	On-State Input Voltage (pin 4)	10…26.4V DC, nominal 24V DC
	Off-State Input Voltage	5V DC
	On-State Input Current (pin 4)	1…3.7 mA, 2.6 mA @ 24V DC
	Off-State Input Current	<1.5 mA
	Maximum Sensor Leakage Current	<2.5 mA
	Maximum Number of Input Devices	6
	Maximum Sensor Sourcing Current (pin 1)	50 mA per point (maximum 300 mA total for sourcing one device)
	Sensor Operating Voltage Range	19.2…26V DC
	Input Bounce Filter§ (Software Configurable)	Off-On or On-Off: 0.5 ms + 64 ms
	Filtering	100 µs
	DeviceLogix I/O Response	2 ms (500 Hz)
Output	Supply Voltage (Switched Power)	A1/A2
	Type of Outputs	DC sourcing
	Load Types	Resistive or light inductive
	Utilization Category (IEC)	DC-1, DC-13
	Output State	Normally Open (N.O.)
	Connection Type	Single keyed M12 , quick disconnect
	Output per Connection	1/each
	Overcurrent Protection♣	1.5 A (the sum of all outputs can not exceed this value)
	Rated Insulation Voltage (U_i)	**UL**: 1500V AC, **IEC**: 2000V AC
	Rated Operating Voltage (U_e)	19.2…26.4V DC
	Maximum Blocking Voltage	35V DC
	Nominal Operating Current (I_e)	500 mA per point
	Maximum Thermal Current (I_{the})	500 mA per point
	Maximum Off-state Leakage Current	1 µA
	Maximum Number of Outputs	6
	Surge Suppression	Integrated diode to protect against switching loads

§ Input ON-to-OFF delay time is the time from a valid input signal to recognition by the module.
♣ If an output exceeds 1.5 A for greater than 7 ms, a fault is generated.

Environmental Ratings	
Operating Temperature Range	-20…+50 °C (-4…+122 °F)
Storage and Transportation Temperature Range	–25...+85 °C (–13…+185 °F)
Altitude	2000 m
Humidity	5…95% (non-condensing)
Pollution Degree	3
Enclosure Ratings	IP66/UL Type 4/12
Approximate Shipping Weight	4.6 kg (10 lb)

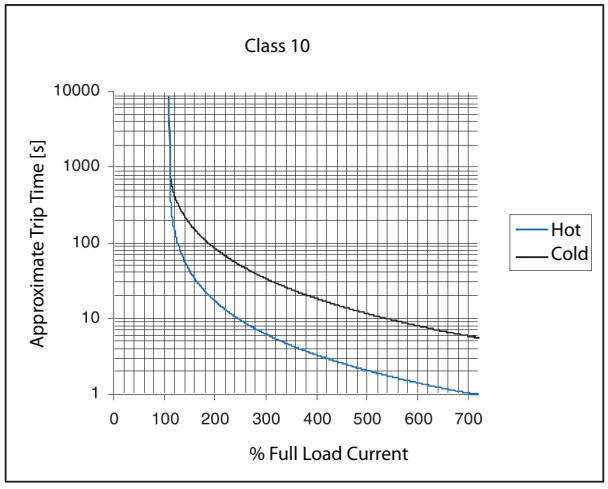
Mechanical Ratings				
Resistance to Shock	Operational	30 G, exceeds IEC 60947-1		
	Non-Operational	50 G, exceeds IEC 60947-1		
Resistance to Vibration	Operational	2.5 G, tested to MIL-STD-810G, exceeds IEC 60947-1		
	Non-Operational	5 G, tested to MIL-STD-810G, exceeds IEC 60947-1		
Disconnect Lock Out	Maximum of 3/8 in. (9.5 mm) diameter lock shackle or hasp			
Disconnect LOTO Locks	Up to 2 locks or hasps are supported			
Disconnect Mechanical Life	200 000 operations			
Contactor Utilization Category (IEC)	AC-1, AC-3, AC-4 (refer to Life Load Curves)			
Contactor Opening Delay	8…12 ms			
Contactor Closing Delay	18…40 ms			
Minimum Off Time	200 ms			
Contactor Mechanical Life	15 million operations			
	Power Terminals	**Motor Terminals**	**Control Terminals**	**PE/Ground**
Wire Size	(2) #18…#10 AWG (0.8…5.2 mm²) per terminal	(2) #18…#10 AWG (0.8…5.2 mm²) per terminal	(2) #18…#10 AWG (0.8…5.2 mm²) per terminal	(2) #16…#10 AWG (1.3…5.2 mm²) per terminal
Wire Type	Multi-strand/solid copper wire			
Tightening Torque	10.6 ± 2 lb•in (1.2 ± 0.2 N•m)			18 ± 2 lb•in (2 ± 0.2 N•m)
Wire Strip Length	0.35 ± 0.01 in. (9 ± 2 mm)			
Power Rating	600V AC/25 Amp VAC	600V AC/10 Amp VAC	600V AC/10 Amp VAC	—

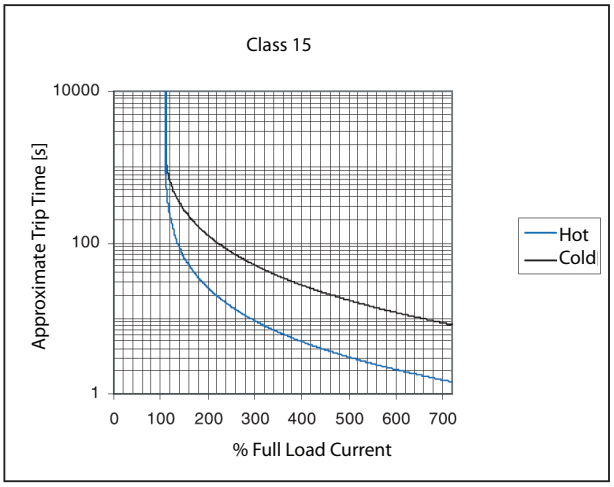
Emission and Immunity Ratings		
Emission	Conducted	EN 60947-4-1 Class A
	Radiated	
	Electrostatic Discharge	4 kV contact, 8 kV air
	Radio Frequency Electromagnetic Field	EN 60947-4-1 10V/m, 80 MHz…1 GHz 10V/m, 1.4 GHz…2 GHz
Immunity	Fast Transient	2 kV (Power) 2 kV (PE) 1 kV (Communication and control)
	Surge Transient	1 kV (12) $_{L-L}$, 2 kV (2) $_{L-N}$ (earth)
	Radio Frequency Conducted Disturbance	10V, 150 kHz…80 MHz

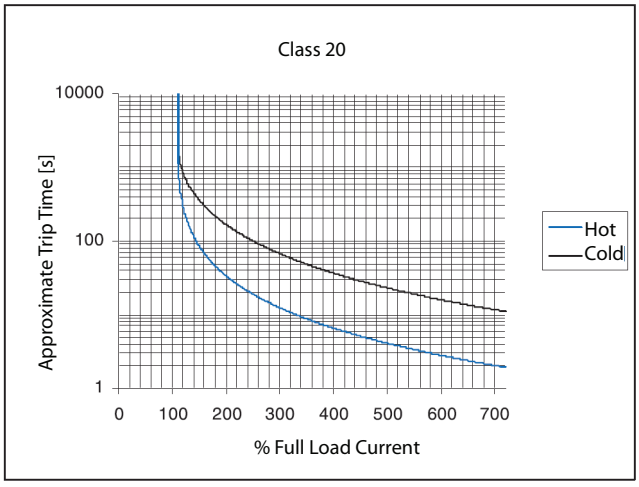
Standards Compliance and Certifications			
	UL/CSA	**EN/IEC**	**Other Agencies**
Standards Compliance	UL 508 Industrial Control Equipment – Suitable for Group Installation CSA C22.2, No. 14	EN 60947-4-1 Low Voltage Switchgear CE Marked per Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC	CCC (Pending) C-Tick (Pending) ODVA for EtherNet/IP
Certifications	cULus (File No. E3125, Guide NLDX, NLDX7)		

Communication Ratings		
	Rated Insulation Voltage	250V
	Operating Dielectric Withstand	**UL/NEMA**: 1500V AC, **IEC**: 2000V AC
EtherNet/IP	EtherNet/IP ODVA - Conformance Testing	EtherNet/IP Interoperability Performance – Per A9 PF 2.1
	Ethernet Communication Rate	10/100 Mbps, half or full-duplex
	Ethernet Ports	2 (embedded switch)
	Ethernet Network Topologies Supported	Star, Tree, Linear, and Ring
	Device Level Ring Support	Beacon Performance, IEEE 1588 Transparent Clock
	Ethernet Connector	M12, D code, female, with Ethernet keying, 4 Pin
	Ethernet Cable	Category 5e: Shielded or unshielded
	IP Configuration	Static, DHCP, or BootP
	DHCP Timeout	30 s
	Data	Transported over both TCP and UDP
	Packet Rate (pps)	500 packets-per-second (2000 µs), Tx 500 packets-per-second (2000 µs), Rx
	Consume Instance (Command)	Default of 3 words (Instance 150)
	Produce Instance (Status)	Default of 14 words (Instance 152)
	Message Support	Unicast or Multicast
	Address Conflict Detection (ACD)	IP v4 Address Conflict Detection for EtherNet/IP devices
	Sockets	150 maximum
Web Server	Security	Login and password configurable
	E-mail	Support Simple Mail Transfer Protocol (SMTP)
	Webpage Features	Status, diagnostics, configuration
	Concurrent Sessions	20
	Web Server	HTTP 1.1
Network Connections	Concurrent TCP Connections	Maximum of 15 encapsulated messages over both TCP and UDP
	Maximum I/O Connections (CIP Class 1)	Supports up to 2 Class 1 CIP connections (Exclusive owner (data) or listen-only). One connection per PLC. Listen-only connection requires a data connection to be established.
	Maximum Concurrent Explicit Messages (CIP Class 3)	6
	Class 1 Connection API	2…3200 ms
	Class 3 Connection API	100…10 000 ms
	Request Packet Interval (RPI)	20 ms default (2 ms minimum)

Motor Overload Trip Curves



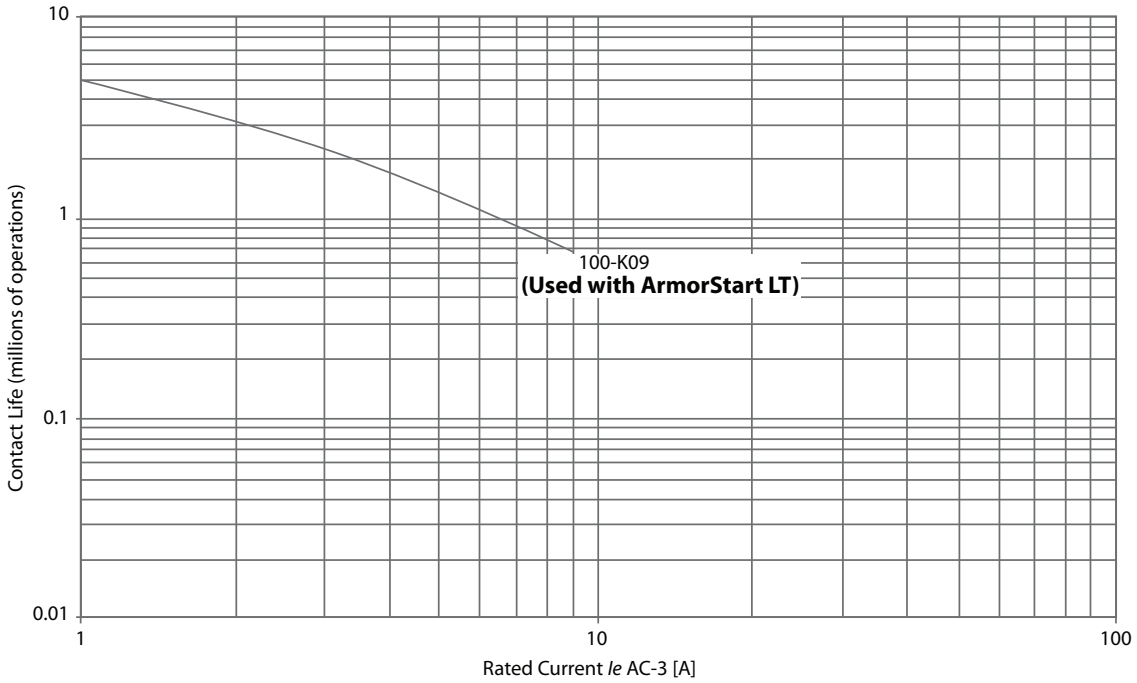




Bulletin 100-K/104-K Life-Load Curves

Electrical life; Ue = 400…460V AC

AC-3 : Switching of squirrel-cage motors while starting



Electrical life; Ue = 400…460V AC

AC-4 : Stepping of squirrel-cage motors