



## Wiring Safety Guide

### ASPYRE DT Power Controllers

Part Number: 2055-8256  
Document Number: 10-37879 Rev. B  
November, 2020

### Safety Information

	<b>CAUTION</b> – Warning or Hazard that needs further explanation than the label on unit can provide. Consult User's Guide for further information.
	Electrical Shock Hazard - Symbol (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement.
	ESD Sensitive product, use proper grounding and handling techniques when installing or servicing product.
	Do not throw in trash, use proper recycling techniques or consult manufacturer for proper disposal.
	Unit is a Listed device per Underwriters Laboratories. It has been investigated to ANSI/UL® 508 standards for Industrial Control Switches and equivalent to CSA C22.2 #14. For more detail search for File E73741 on www.ul.com.
	Unit is compliant with European Union directives. See Declaration of Conformity for further details on Directives and Standards used for Compliance.

### Safety Notes

**WARNING!** To avoid damage to property and equipment, injury and loss of life, adhere to applicable electrical codes and standard wiring practices when installing and operating this product. Failure to do so could result in damage, injury and death.

**WARNING!** All service including inspection, installation, wiring, maintenance, troubleshooting, fuse or other user-serviceable component replacement must be performed only by properly qualified personnel. Service personnel must read this manual before proceeding with work. While service is being performed, other, unqualified personnel should not work on the unit or be allowed in the immediate vicinity.

**WARNING!** When in use, the power controller is connected to dangerous voltages. Do not remove the protective covers without first disconnecting and preventing power from being restored while servicing the unit.

**WARNING!** Electric Shock Hazard: when the power controller has been energized, after shutting off the power, wait at least one minute for internal capacitors to discharge before commencing work that brings you in to contact with power connections or internal components.

**WARNING:** The installation must be protected by electromagnetic circuit breakers or by fuses. The semiconductor fuses located inside the power controller are classified for UL® as supplementary protection for semiconductor devices. They are not approved for branch circuit protection.

**NOTE!** The nominal current is specified for ambient temperatures at or below 40° C. Ensure the application design allows for adequate cooling of each power controller. The power controller must be mounted vertically. The cooling design must prevent air heated by one power controller from causing power controllers mounted above to exceed the ambient operating temperature limit. When power controllers are mounted side by side allow a minimum spacing of 15mm between them.

**NOTE!** Use only copper cables and wires rated for use at 75°C or greater.

**AVERTISSEMENT!** Pour éviter d'endommager la propriété et l'équipement, les blessures et la perte de vie, respecter les codes électriques en vigueur et les pratiques de câblage standard au moment de l'installation et de l'utilisation de ce produit. Dans le cas contraire, cela peut entraîner la mort, des blessures graves ou des dommages.

**AVERTISSEMENT!** Tous les services, y compris l'inspection, l'installation, le câblage, l'entretien, le dépannage, le remplacement de fusibles ou d'autres composants pouvant être réparés par l'utilisateur, doivent être effectués uniquement par un personnel dûment qualifié. Le personnel de service doit lire ce manuel avant d'effectuer tout travail. Pendant que l'entretien est exécuté, tout personnel non qualifié ne doit effectuer de travail sur l'appareil ni se trouver à proximité.

**AVERTISSEMENT!** Au moment de l'utilisation, le régulateur de puissance est connecté à des tensions dangereuses. Ne retirer aucun couvercle de protection sans d'abord débrancher l'appareil et ainsi empêcher l'alimentation d'être rétablie pendant l'entretien.

**AVERTISSEMENT!** Risque de décharges électriques : lorsque le régulateur de puissance est mis sous tension, après avoir été éteint, attendre au moins une minute pour que les condensateurs internes se déchargent avant de commencer tout travail incluant le contact avec les connexions électriques ou les composants internes.

**AVERTISSEMENT!** L'installation doit être protégée par des disjoncteurs électromagnétiques ou des fusibles. Les fusibles pour semi-conducteurs situés à l'intérieur du régulateur de puissance sont classés UL® comme protection supplémentaire pour les dispositifs pour semi-conducteurs. Ils ne sont pas approuvés pour la protection des circuits de dérivation.

**REMARQUE :** Le courant nominal est précisé pour des températures ambiantes égales ou inférieures à 40°C. S'assurer que la conception de l'application permette le refroidissement adéquat de chaque régulateur de puissance. Le régulateur de puissance doit être monté verticalement. La conception de refroidissement doit empêcher l'air chauffé par le régulateur de puissance de dépasser la limite de température de fonctionnement ambiante de la part des régulateurs de puissance montés au-dessus. Lorsque les régulateurs de puissance sont montés côte à côte, il faut conserver un espacement minimal de 15 mm entre les deux.

**REMARQUE :** N'utiliser que des câbles et des fils en cuivre pour l'utilisation à 75°C ou plus.

### Identifying the Product

The product identification label includes not only the part number but also the voltage and current ratings and auxiliary and fan voltage requirements.

Max. Load Current: 120A	Use Wire rated 75°C, Max Ambient 40°C	
Max. Load Voltage: 600Vac ~ 50/60Hz	For use in Pollution	
Auxiliary Voltage : 540-660Vac ~ 50/60Hz 6VA	Degree 2 Environment	
Fan Voltage : 120 VAC	User Manual:	
Second Port : Modbus TCP	1917-1409	
1 Phase 1 Leg Control		

### Specifications

#### Environment

- Ambient operating temperature: 0 to 40°C. See user manual for de-rating over 40°C.
- Mount power controllers vertically
- 5 to 95% RH (relative humidity), non-condensing
- Up to 6560 feet (2000m) above sea level maximum
- Over 1000 meters of altitude reduce the nominal current by 2% for each 100 meters
- Storage temperature: -25 to 70°C max.
- Pollution degree: Installation Category III, Pollution degree 2
- Install away from direct sun light, conductive dust, corrosive gas, vibration, water and corrosive salts.

#### SCCR Rating

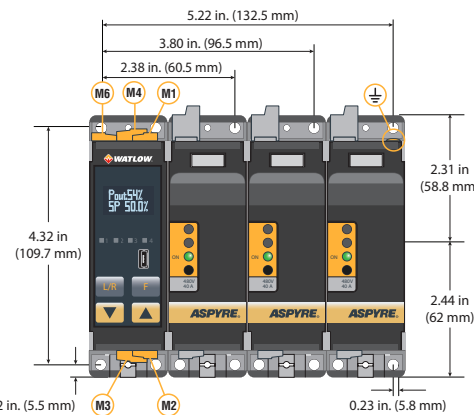
- SCCR rating 100,000A up to 600VAC

### Terminal Identification and Mounting Holes

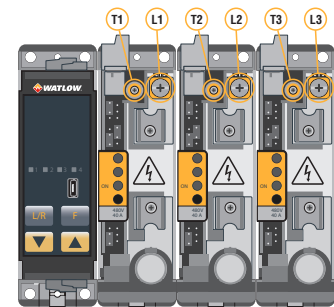
The following illustrations show the locations for line power, load, earth ground and signal connections. Line connections are: L1, L2, L3. Load connections are: T1, T2 and T3.

#### Connection Locations 35A to 40A Models

Covers Closed



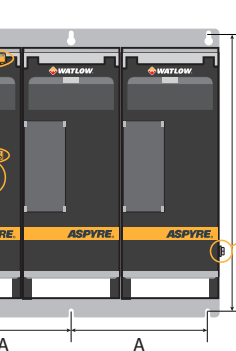
Covers Tipped Forward



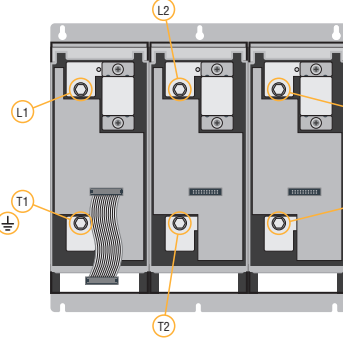
**NOTE!** Three-phase, three-leg model is shown. Single-phase and three-phase, two-leg models have fewer power and load connections.

#### Connection Locations 60A to 210A, 400V & 600V Models

Covers Closed



Covers Tipped Forward

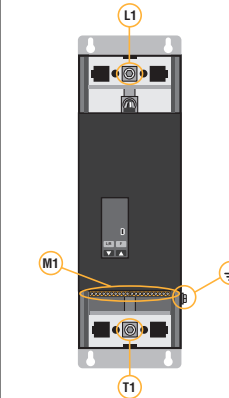


#### Mounting Slots for 60A to 210A, 400V & 600V Models

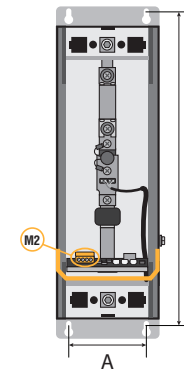
Model	A	B (no fans)	B (with fans)	Slot Width	Hole Size
DT1...	2.80 in. (71 mm)	10.06 in. 256 mm	10.24 in. 260 mm	0.2 in. 5 mm	0.35 in. 9 mm
DT2...	6.50 in. (165 mm)				
DT3...	5.10 in. (129.5 mm) 2 pl.				

#### Connection Locations Single-Phase, 60A to 210A, 690V Models

Top & Bottom Covers Off

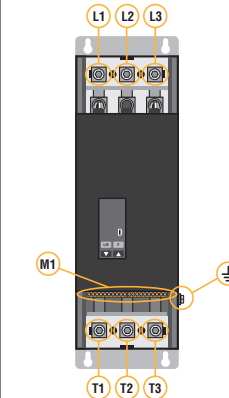


Center Cover Tipped Forward

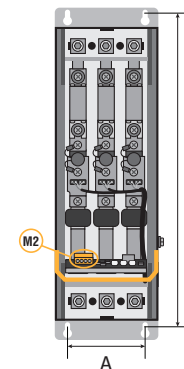


#### Connection Locations Three-Phase, 60A & 90A, 690V Models

Top & Bottom Covers Off

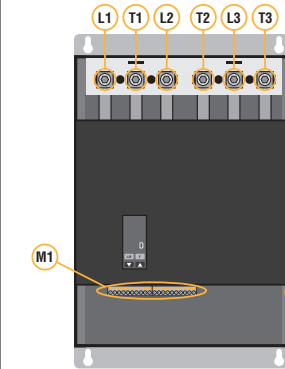


Center Cover Tipped Forward

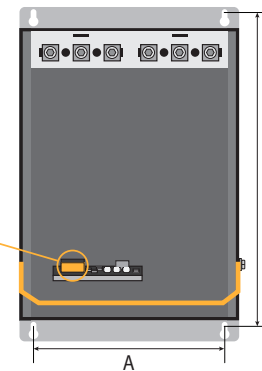


#### Connection Locations Three-Phase, 120A to 210A, 690V Models

Top & Bottom Covers Off

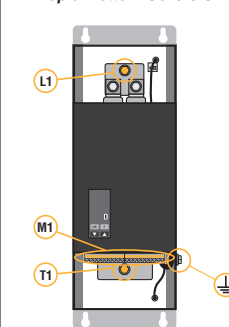


Top & Bottom Covers Off

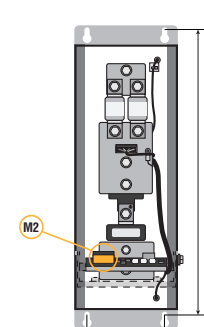


#### Connection Locations Single-Phase, 300A to 700A Models

Top & Bottom Covers Off

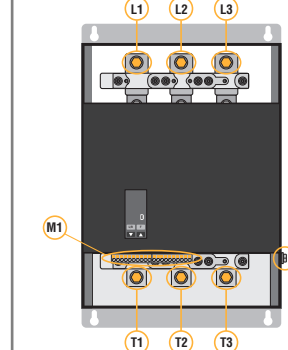


Center Cover Tipped Forward

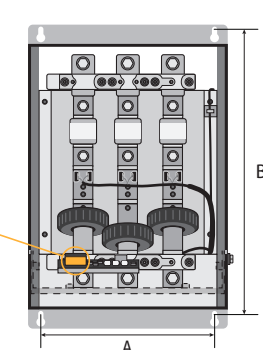


#### Connection Locations Three-Phase, 300A to 700A Models

Top & Bottom Covers Off



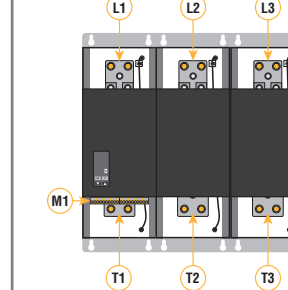
Center Cover Tipped Forward



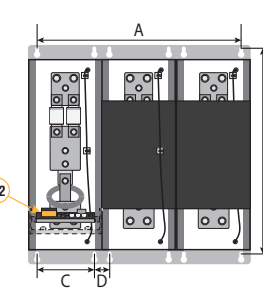
**NOTE!** Three-leg, 400A model shown. The width of the bus bar, number of bolts, number of fuses and their placement vary by model. In all cases the M2 connector is as indicated.

#### Connection Locations 800A Models

Top & Bottom Covers Off



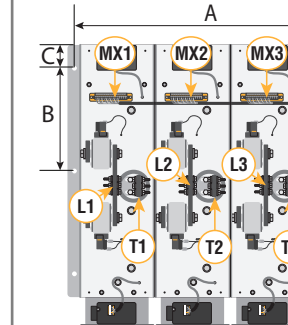
Center Cover Tipped Forward



**NOTE!** Three-leg model shown. The number of modules varies by model. In all cases the M1 and M2 connectors are in the left-most module and earth ground is on the right.

#### Connection Locations 1100A to 2100A Models

Covers Off



**NOTE!** Three-leg model shown. The number of modules varies by model. In all cases the M1 and M2 connectors are in the left-most module and earth ground is on the right.

#### Mounting Slots for 60A to 210A, 690V & 300A to 2100A Models

Model	Current (A)	A	B	C	D	Slot Width	Hole Size
DT....	60 to 90	3.82 in. (97 mm)	16.14 in. 410 mm			0.28 in. 7 mm	0.47 in. 12 mm
DT1...	120 to 210						
DT2...	120 to 210						
DT3...	120 to 210	8.74 in. (222 mm)					
DT1...	300 to 700	3.82 in. (97 mm)	19.29 in. 490 mm				
DT2...	300 to 700	8.74 in. (222 mm)					
DT3...	300 to 500	8.74 in. (222 mm)					
DT1...	800	3.82 in. (97 mm)	20.87 in. 530 mm	3.82 in. 97 mm	1.65 in. 42 mm		
DT2...	800	9.25 in. (235 mm)					
DT3...	800	14.61 in. (371 mm)					
DT1...	1100	11.97 in. (304 mm)	8.56 in. 218 mm	1.97 in. 50 mm		N/A (no slot)	0.33 in. 8.5 mm
DT2...	1100	19.61 in. (498 mm)					
DT3...	1100	27.24 in. (692 mm)					
DT1...	1400 to 2100	11.97 in. (304 mm)	10.53 in. 268 mm				
DT2...	1400 to 2100	19.61 in. (498 mm)					
DT3...	1400 to 2100	27.24 in. (692 mm)					

### Wiring Instructions

Select cables or bus bar for line power, load connections and earth grounds per National Electric Code or local applicable electric code.

Load wiring for 35A and 40A models requires 90°C rated wire otherwise use 75°C wire.

Connect RS-485 communication common to any analog common terminal.

If using the 10VDC power supply to power dry contact switches connected to digital inputs, connect the digital input common to the analog common.

**⚠NOTE!** For models that require auxiliary power to be supplied, the auxiliary power must be synchronized with the phase connected to the L1 line power input. The auxiliary voltage is indicated on the product identification label and encoded in the part number as the nominal voltage (character 9).

**Line Power, Load and Earth Ground Torque**

Current	Voltage	Line Power & Load Torque	Earth Ground
35A to 40A	400/600V	26.6 in.-lb. (3.0 Nm)	31 in.-lb. (3.5 Nm)
60A to 120A	400/600V	70.8 in.-lb. (8.0 Nm)	70.8 in.-lb. (8.0 Nm)
150A to 210A	400/600V	141.6 in.-lb. (16.0 Nm)	
60A to 210A	690V	177 in.-lb. (20.0 Nm)	
300A to 2100A	400/600/690V	265 in.-lb. (30 Nm)	177 in.-lb. (20.0 Nm)

**Control Signal Torque**

4 in.-lb. (0.11 Nm)

**Control Signal Terminals 35A to 40A Models**

**M1 Terminal Connections**

M1	Function	Description
10	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
11	Factory connection	
12	Factory connection	
13	Factory connection	
14		C (common)
15	Alarm output	NO (normally open contact)
16		NC (normally closed contact)

**M2 Terminal Connections**

M2	Function	Description
1	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
2	Digital input common	Reference to analog common, if necessary
3	Digital input 2	
4	Digital input 1	
5	Analog input 1+	Set point signal input
6	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
7	+10VDC power supply	For digital inputs and potentiometer
8-9	Not used	

**M3 Terminal Connections**

M3	Function	Description
A+	Port 1 Modbus® RTU RS-	Connect to B+ on USB-to-485 adapter
B-	485	Connect to A- on USB-to-485 adapter

**M4 Terminal Connections**

M4	Function	Description
L1	Auxiliary power input	Line 1
-	Not used	
L2/N	Auxiliary power input	Line 2 or neutral (DT1 models)

**M6 Terminal Connections**

M6	Function	Description
17	24VDC power input	Supplemental power for the Ethernet switch and applications that use both analog retransmit and the second communication port
18	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
19	Analog input 2+	Alternate set point, external feedback or current limit (DT1)
20	Retransmit output+	

**Control Signal Terminals 60A to 210A, 400V and 600V Models**

**M1 Terminal Connections (90A to 210A only)**

M1	Function	Description
F1	Power input for fan	+ For DC fans, line or neutral for AC fans
F2		- For DC fans, line or neutral for AC fans

**M2 Terminal Connections (DT1 and DT2 only)**

M2	Function	Description
L1	Auxiliary power input	Line 1
-	Not used	
L2/N	Auxiliary power input	Line 2 or neutral on single-phase units

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**M3 Terminal Connections**

M3	Function	Description
1	Analog common 10V & 24V	For digital inputs and potentiometer
2	Digital input common	Reference to analog common, if necessary
3	Digital input 2	
4	Digital input 1	
5	Analog input 1+	Set point signal input
6	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
7	+10VDC power supply	For dry contact digital inputs or potentiometers for analog inputs
8	Analog input 2+	Alternate set point, external feedback or current limit (DT1 and DT3)
9	Not used	
10	Retransmit output+	
11	Port 1 Modbus® RTU RS-485	Connect to B+ on USB-to-485 adapter
12	RS-485	Connect to A- on USB-to-485 adapter
13	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
14		C (common)
15	Alarm output	NC (normally closed contact)
16		NO (normally open contact)

**M4 Terminal Connections for Modbus® RTU Secondary Communication Option**

M4	Function	Description
1	+24VDC input	Supplemental power for the Ethernet switch and applications that use both analog retransmit and the second communication port
2	Analog common 10V & 24V	For 24VDC input and RS-485 common
3-5	Not used	

**Control Signal Terminals 60A to 210A, 690V & 300A to 800A Models**

**M1 Terminal Connections**

M1	Function	Description
1		NO (normally open contact)
2	Alarm output	C (common)
3		NC (normally closed contact)
4	Analog input 2+	Alternate set point, external feedback or current limit (DT1 and DT3)
5	Digital input 2	
6	Digital input 1	
7	Port 1 Modbus® RTU RS-485*	Connect to B+ on USB-to-485 adapter
8	RS-485*	Connect to A- on USB-to-485 adapter
9	+10VDC power supply	For dry contact or potentiometer inputs
10	Analog common 10V & 24V	For analog inputs, retransmit and RS-485 common
11	Analog common 10V & 24V	
12	Analog input 1+	Set point signal input
13	Digital input common	Reference to analog common, if necessary
14	Not Used	
15		+ For DC fans, line or neutral for AC fans
16	Power input for fan	- For DC fans, line or neutral for AC fans
17	Not used	
18	Auxiliary power input	Line 1
19	Not used	
20	Auxiliary power input	Line 2 or neutral on single phase units

**M2 Terminal Connections**

M2	Function
1	+24VDC supplemental power for the Ethernet switch and applications that use both analog retransmit and the second communication port (other than Modbus® RTU)
2	Unused
3	Retransmit output+
4	Analog common 10V & 24V for 24VDC input, retransmit output and RS-485

**Control Signal Terminals 1100A to 2100A Models**

**Mx Terminal Connections\***

Mx	Function
1 to 12	Internal connections
13 & 14	Thermal switch (closed when OK, open with over temperature)
15 & 16	Power input for fan. See fan voltage on product identification label

\*One per switched leg (1 to 3).

**M4 Terminal Connections for Modbus® RTU Secondary Communication Option**

M4	Function	Description
1	Auxiliary power input	Line 1
2	Not used	
3	Auxiliary power input	Line 2 or neutral on single-phase units

**Sync Terminal Connections (Single-Phase and Three-Phase, Two-Leg Models Only)**

	Function
1	For single-phase models connect to neutral. For three-phase, two-leg connect to L2.
2	Connect to either terminal; terminals are internally shorted.

**M5 Terminal Connections**

M5	Function	Description
1		NO (normally open contact)
2	Alarm output	C (common)
3		NC (normally closed contact)
4	Analog input 2+	Alternate set point, external feedback or current limit (DT1 and DT3)
5	Digital input 2	
6	Digital input 1	
7	Port 1 Modbus® RTU	Connect to B+ on USB-to-485 adapter
8	RS-485*	Connect to A- on USB-to-485 adapter
9	+10VDC power supply	For dry contact or potentiometer inputs
10	Analog common 10V & 24V	
11	Analog common 10V & 24V	For analog inputs, retransmit and RS-485 common
12	Analog input 1+	Set point signal input
13	Digital input common	Reference to analog common, if necessary
14	Not Used	
15		NO (normally open contact)
16	Blown fuse alarm	C (common)
17		NC (normally closed contact)

**M6 Terminal Connections**

M6	Function
1	+24VDC supplemental power for the Ethernet switch and applications that use both analog retransmit and the second communication port
2	Analog common 10V & 24V for 24VDC input, retransmit output and RS-485
3	Unused
4	Retransmit output+

**Communication Port Options**

All models include at least one RS-485 communication port. Some models include a second communication port.

**Communication Options 35A to 40A Models**

Model	Communication Option	Connector Type	Connector Location
DT__ - - - - 0__	No additional port	N/A	N/A
DT__ - - - - 1__	Modbus® TCP (Ethernet)	RJ-45	Top, next to M1
DT__ - - - - 3__	Profibus DP	DB9	Top, next to M1
DT__ - - - - 4__	Profinet	RJ-45	
DT__ - - - - 5__	EtherNet/IP™	RJ-45	

**Communication Options 60A to 210A, 480V and 600V and all 1100A to 2100A Models**

Model	Communication Option	Connector Type
DT__ - - - - 0__	No additional port	N/A
DT__ - - - - 1__	Modbus® TCP (Ethernet)	RJ-45
DT__ - - - - 3__	Profibus DP	DB9
DT__ - - - - 4__	Profinet	RJ-45
DT__ - - - - 5__	EtherNet/IP™	RJ-45

**Communication Options 60A to 210A, 690V and all 300A to 800A Models**

Model	Communication Option	Connector Location on Daughter Card
DT__ - - - - 0__	No additional port	N/A
DT__ - - - - 1__	Modbus® TCP (Ethernet)	RJ-45 on right side
DT__ - - - - 3__	Profibus DP	DB9 connector on right side
DT__ - - - - 4__	Profinet	RJ-45 on right side
DT__ - - - - 5__	EtherNet/IP™	RJ-45

**Agency Approval and Regulatory**

- 35A to 700A models: cULus 508 Listed File E73741
- 35A to 700A models: cUL® Listed to C22.2 No. 14
- 800A to 1600A models: UL® 508 Listed File E7341
- 1800A to 2100A models: no UL® (testing planned)
- IP 20 with all covers in place
- Utilization Category: AC-51, AC-55b, AC-56a
- 690 VAC units not covered by UL®
- SCCR rating 100,000A up to 600VAC

**Declaration of Conformity**

Meets the essential requirements of these European Standards:

2014/35/EU Low-Voltage Directive via  
EN 60947-1: 2007: A1 2011, A2 2014  
EN 60947-4-3: 2014

2014/30/EU Electromagnetic Compatibility Directive via  
EN 60947-4-3: 2014 Group 1 Class A Emissions\*  
EN 60947-4-3: 2014 Industrial Immunity  
EN 60947-1 2007:A1 2011, A2 2014

2011/65/EU RoHS Directive

2012/19/EU W.E.E Directive

\*Not for use in Class B commercial or residential applications without additional filtering for emissions.

**Replacement Fuses**

**Fuses for 35A to 40A Models**

ASPYRE Model	Qty.	Fuse Part Numbers	
		Watlow	Cooper Bussman®
DT__ - - -035...	1 to 3*	17-8050	FWP-50A14Fa
DT__ - - -040...			

\*One fuse per switched leg.

**Fuses for 60A to 210A Models**

ASPYRE Model	Qty.	480V and 600V		690V	
		Watlow	Siba	Watlow	Siba
DT__ - - -060...	1 to 3*	0808-0363-0160	20 559 20.160	2048-2760	20 282 20.160
DT__ - - -090...					
DT__ - - -120...					
DT__ - - -150...					
DT__ - - -180...					
DT__ - - -210...					

\*One fuse per switched leg.

**Fuses for 300A to 800A Models**

Model	Qty.	Fuse Part Numbers		
		Watlow	Cooper Bussman®	Siba
DT1__ -300...	1	0808-0362-0000	350FM	
DT1__ -400...	1	0808-0358-0000	550FMM	
DT1__ -500...	1	0808-0359-0000	700FMM	
DT1__ -600...	4	0808-0363-0250		20 559 20.250
DT1__ -700...	4			
DT248-300...	3	0808-0357-0000	450FMM	
DT260-300...	3			
DT269-300...	3	2055-5072	400FMM	
DT2__ -400...	3	0808-0358-0000	550FMM	
DT2__ -450...	6	0808-0360-0000	315FM	
DT2__ -500...	6			
DT2__ -600...	4	0808-0357-0000	450FMM	
DT2__ -700...	4			
DT348-300...	3			
DT360-300...	3	2055-5072	400FMM	
DT369-300...	3			
DT3__ -350...	3	0808-0358-0000	550FMM	
DT3__ -400...	3			
DT3__ -450...	3	0808-0359-0000	700FMM	
DT3__ -500...	3			
DT__ - -800...	4 - 12*	0808-0363-0250		20 559 20.250

\*Four fuses per switched leg.

**Fuses for 1100A to 2100A Models**

ASPYRE Model	Qty.	480V and 600V		690V	
		Watlow	Third-Party**	Watlow	Siba
DT__ - - -1K1...	2 to 6*	2078-4945	20 681 32 800	2078-5301	20 781 32 1000
DT__ - - -1K4...					
DT__ - - -1K6...					
DT__ - - -1K8...					
DT__ - - -2K1...					
		2078-5261	20 681 32 1400	2078-5413	20 781 32 1400
		2078-5400	170M6469		

\*Two fuses per switched leg. \*\*Siba except for 170M6469 which is Cooper Bussman®

**Torque for Replacement Fuses**

	480V and 600V	690V
60A to 120A	26.6 in.-lb. (3 Nm)	44.3 in.-lb. (5 Nm)
150A to 210A	44.3 in.-lb. (5 Nm)	
300A to 800A	221.3 in.-lb. (25 Nm)	
1100A to 2100A	371.7 in.-lb. ± 88.5 in.-lb. (42 Nm ± 10 Nm)	

**User Manuals**

Complete user manuals are available at [www.watlow.com/aspire](http://www.watlow.com/aspire).

**Technical Assistance**

If you encounter a problem with your Watlow controller, review your configuration information to verify that your selections are consistent with your application: inputs, outputs, alarms, limits, etc. If the problem persists, you can get technical assistance from your local Watlow representative (see back cover), by e-mailing your questions to [wintechsupport@watlow.com](mailto:wintechsupport@watlow.com) or by dialing +1 (507) 494-5656 between 7 a.m. and 5 p.m. Central Time USA & Canada. Ask for an Applications Engineer. Please have the complete model