

# Assembly Instructions for: S1 to S9 Junction Boxes (UL) MS1 to MS9 Junction Boxes (UL)

**IMPORTANT:** This document should be read carefully before commencing installation

**Zones of Use of Terminal Box**

Class I Zone I AExe II

**Service Temperature**

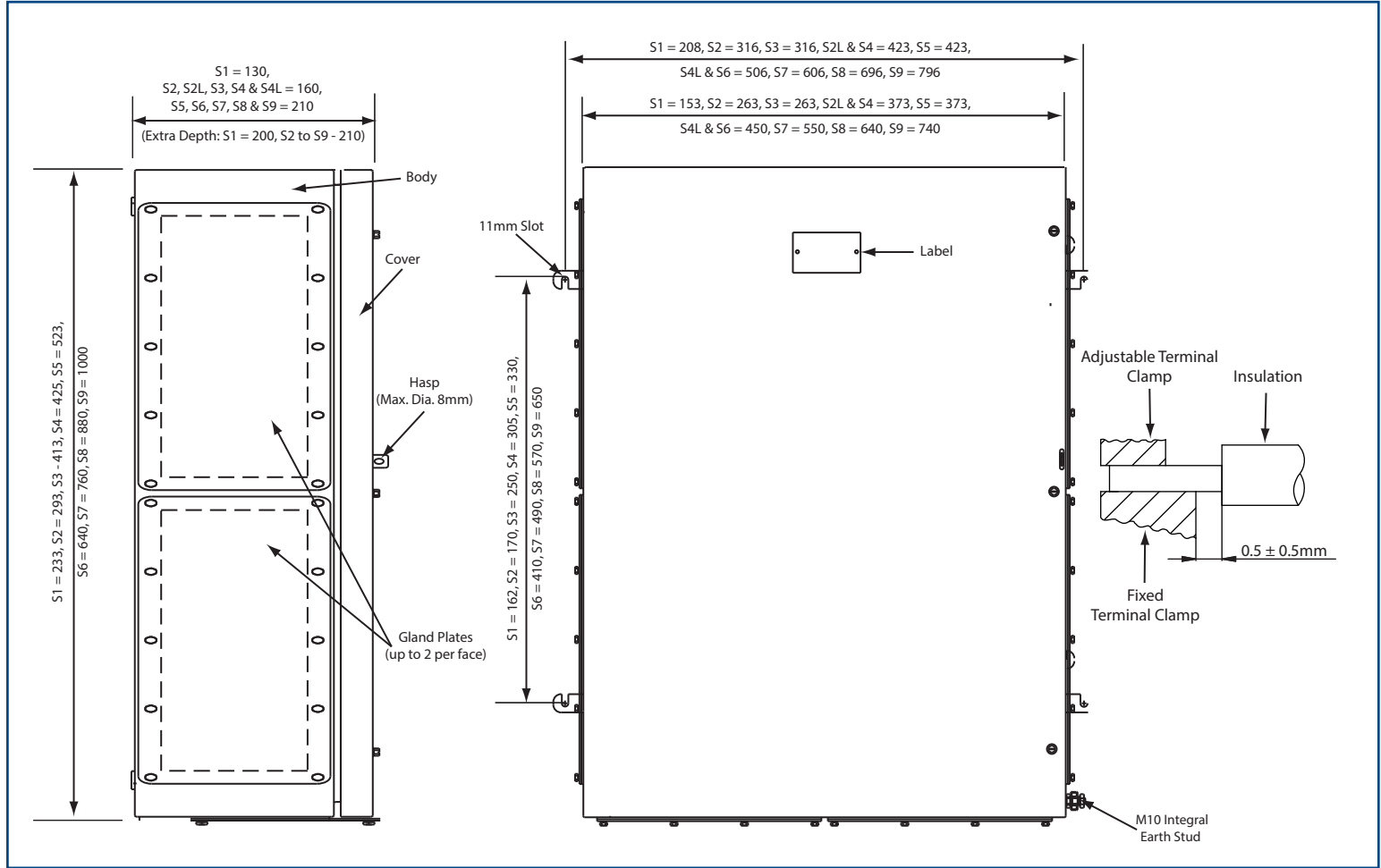
S1 to S9 -60°C to +60°C

MS1 to MS9 -60°C to +60°C

**Minimum Installation Temperature: -5°C**

**Certification Details**

Box Type: S1 to S9 & MS1 to MS9 (UL Listed)



W = Maximum Dissipated Wattage      N = No. of Terminals Fitted      F = Combined Terminal Resistance      I = Maximum Current

$$W = N \times F \times I^2 \qquad N = W / F \times I^2 \qquad I = \text{Sqrt}(W / N \times F)$$

Box Type	Maximum Power Dissipation (Watts)															Max. Cable Length Per Terminal (M)		
	T*	T**	T***	T*	T**	T***	T*	T**	T***	T*	T**	T***	T*	T**	T***			
	T6	80°C	-40/+40°C	T6	80°C	-40/+55°C	T6	80°C	-40/+65°C	T5	80°C	-40/+40°C	T5	80°C	-40/+55°C		T5	80°C
Size 1		13.95			8.7			5.2			19.1			13.95			10.4	0.307
Size 2		18.15			11.3			6.8			24.9			18.15			13.6	0.425
Size 2L		18.15			11.3			6.8			24.9			18.15			13.6	0.495
Size 3		23.70			14.8			8.8			32.5			23.70			17.7	0.515
Size 4		29.95			18.7			11.2			41.1			29.95			22.4	0.579
Size 4L		29.95			18.7			11.2			41.1			29.95			22.4	0.653
Size 5		32.85			20.5			12.3			45.1			32.85			24.6	0.662
Size 6		40.00			25.0			15.0			55.0			40.00			30.0	0.792
Size 7		52.00			23.5			19.5			71.5			52.00			39.0	0.945
Size 8		65.00			40.6			24.3			89.3			65.00			48.7	1.090
Size 9		79.35			49.5			29.7			109.1			79.35			59.5	1.238

#### **TO OPEN THE LID:**

1. Disconnect power (isolate all circuits).
2. Unlock padlock (if fitted) and remove.
3. Untighten the M6 lid securing screws.
4. a) Carefully swing the lid back on its hinges ensuring the seal is not displaced or damaged.  
b) The lid may be removed completely by opening to approximately 110° and lifting off.  
c) Ensure correct gasket is fitted for area of use.

#### **TO CLOSE THE LID:**

1. Check that the gasket is correctly secured to the underside of the lid and undamaged. If the lid has been removed, completely reverse the procedure at 4b) ensuring that the correct lid is refitted.
2. Locate and tighten all M6 lid securing screws into the box body.
3. Replace and lock the padlock on the lid, if required.

#### **ENCLOSURE INSTALLATION (EI)**

- a) The IP rating of the enclosure must be maintained for the area of use by the use of correct arrangement of cable/gland/sealing arrangements and in accordance with the NEC code, article 505.
- b) Where other certified components are part of the assembly, the user must take account of any limitations listed on relevant installation and use instructions.
- c) If an optional Breather/Drain as listed on the enclosure certificate is fitted the enclosure must be sited such that the Breather/Drain is pointing vertically downwards from the bottom of the box, and the IP rating of the selected Breather/Drain shall match the IP rating of the enclosure.
- d) The enclosure may be ready supplied with cable entries. Where the customer drills cable entries they must be installed in accordance with the following: A maximum clearance on the entry thread of 0.7mm for plain holes and where adjacent cable entries are installed sufficient clearance must be maintained to allow for the fitting of sealing/retaining washers and the rotation of the cable gland hexagons.
- e) All unused entry apertures must be sealed using a listed AExe II close-up/stopping plug, and also the IP rating of the junction box shall be maintained for the zone of use.
- f) The apparatus must not be modified in anyway without reference to Hawke, as this will invalidate the certification, except for EI d) and e) and TW j) and k).

#### **TERMINAL WIRING (TW)**

- a) All wiring must be carried out in accordance with the relevant code of practice and/or instructions e.g. NEC code, article 505.
- b) The voltage and current and maximum dissipated power shown on the label must not be exceeded.
- c) When used as a general purpose junction box it must have current protection in accordance with the NEC code, articles 250 & 505.
- d) Where a major portion of the terminals are carrying maximum rated current the temperature at the branching point of the conductors may exceed 70°C. Under these circumstances the installer must ensure that the limiting temperature for the cable insulation used is acceptable e.g. 85°C (T6) or 100°C (T5).
- e) The wiring insulation must extend to within 1mm of the metal face of the terminal, unless the relevant certificates allows more. (See terminal schedule for limitations).
- e) All leads must be insulated for the appropriate voltage.
- e) Not more than one single or multiple stranded lead shall be connected into either side of the terminals, unless the relevant component certificate allows more, or unless the multiple conductors have been previously joined in a suitable manner (for example with an insulated crimped boot lace ferrule, mounted in a vertical position) such that they form a single cohesive item for insertion into the terminal way.
- e) A parallel shaft screwdriver of the correct size should be used.
- f) Only those terminals shown on Drg. D2592 terminal schedule may be incorporated in the box. The installer must ensure that the conditions of use for the terminals outlined are complied with.
- g) All terminal screws used and unused shall be fully tightened down.
- h) The installer shall ensure creepage and clearance distances are not reduced, in accordance with the NEC code, articles 504.20 & 725.55 for separation of Class 2 and Class 3 circuits from Class 1 circuits.
- i) The use of any cross connection/jumper devices between adjacent terminal ways shall be in accordance with the requirements of the relevant component certificate listed on Drg. D2592 held on UL File Number E181955.
- j) Use of the terminal box at ambient temperatures below -20°C is dependant upon the minimum service temperature of the terminals.
- k) When the terminals are fitted with conductors less than the maximum specified, the watts dissipation must be checked to ensure compliance. See formula on Page 1.

#### **EARTHING:**

- a) Where there is a requirement for bonding of gland plate, this shall be done in accordance with the NEC code, articles 250 & 505.25. In the case of painted boxes, consideration must be given to the removal of the paint. e.g. under a serrated washer on the inside of the box which may lead to corrosion of the enclosure and potential reduction in earthing protection. This area following installation must be protected against corrosion.
- b) The earth terminal must accept conductors that are at least equal in cross section to the largest live conductor in accordance with the NEC code, articles 505.

**Note :** *There is an integral connection from the internal earth connection through to the external of the box.*

## SCHEDULE OF TERMINALS FITTED

Size 1 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	30	15	23	17	0.0020454546	10	0.4 - 0.8
WDU4	22	10	600	25	20	20	22	0.0013804169	10	0.5 - 1.0
WDU6	20	8	550	19	27	17	29	0.0009487995	12	0.8 - 1.6
WDU10	16	6	550	15	38	13	40	0.0006247038	12	1.2 - 2.4
WDU16	14	6	600	13	43	8	53	0.0005747038	16	2.0 - 4.0
WDU35	12	2	600	9	76	6	87	0.0002675606	18	4.0 - 5.0

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 2 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	78	9	23	17	0.002704815	10	0.4 - 0.8
WDU4	22	10	600	50	14	20	22	0.001791848	10	0.5 - 1.0
WDU6	20	8	550	42	11	17	29	0.001205863	12	0.8 - 1.6
WDU10	16	6	550	36	15	14	40	0.000787945	12	1.2 - 2.4
WDU16	14	6	600	28	29	8	53	0.000737945	16	2.0 - 4.0
WDU35	12	2	600	20	52	7	87	0.000331965	18	4.0 - 5.0
WDU70N	6	2	600	8	112	5	134	0.000178278	22	8.0 - 12.0
WFF35 *	14	00	600	6	76	6	76	0.000271965	Bolt Size M6	3.0 - 6.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 2L Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	117	6	15	17	0.003998	10	0.4 - 0.8
WDU4	22	10	600	75	9	14	22	0.002592	10	0.5 - 1.0
WDU6	20	8	550	63	12	11	29	0.001805	12	0.8 - 1.6
WDU10	16	6	550	54	17	10	40	0.001106	12	1.2 - 2.4
WDU16	14	6	600	42	24	8	53	0.000719	16	2.0 - 4.0
WDU35	12	2	600	30	40	6	87	0.000359	18	4.0 - 5.0
WDU70N	6	2	600	76	16	5	134	0.000193	22	8.0 - 12.0
WFF35 *	14	00	600	6	76	6	76	0.000299	Bolt Size M6	3.0 - 6.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 3 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	126	7	25	17	0.0032077170	10	0.4 - 0.8
WDU4	22	10	600	94	10	23	22	0.0021056505	10	0.5 - 1.0
WDU6	20	8	550	72	15	20	29	0.0014019275	12	0.8 - 1.6
WDU10	16	6	550	56	21	16	40	0.0009124510	12	1.2 - 2.4
WDU16	14	6	600	48	23	9	53	0.0008624510	16	2.0 - 4.0
WDU35	12	2	600	36	41	8	87	0.0003810870	18	4.0 - 5.0
WDU70N	6	00	600	14	21	6	134	0.0036049315	22	8.0 - 12.0
WFF35 *	14	2	600	11	76	11	76	0.0003210870	Bolt Size M6	3.0 - 6.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 4 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	189	6	29	17	0.0035653362	10	0.4 - 0.8
WDU4	22	10	600	141	9	26	22	0.0023287993	10	0.5 - 1.0
WDU6	20	8	550	108	13	23	29	0.0015413515	12	0.8 - 1.6
WDU10	16	6	550	84	18	18	40	0.0010009886	12	1.2 - 2.4
WDU16	14	6	600	72	20	11	53	0.0009509886	16	2.0 - 4.0
WDU35	12	2	600	54	36	9	87	0.0004160182	18	4.0 - 5.0
WDU70N	6	00	600	30	67	7	134	0.0002211357	22	8.0 - 12.0
WDU70/95	6	00	600	11	110	7	134	0.0002311357	30	6.0 - 12.0
WDU120/150	6	000	600	9	119	7	162	0.0001537234	35	10.0 - 20.0
WFF35 *	14	2	600	11	76	14	76	0.0003560182	Bolt Size M6	3.0 - 6.0
WFF70 *	14	00	600	9	116	11	116	0.0001911357	Bolt Size M8	6.0 - 12.0
WFF120 *	10	250MCM	600	7	162	11	162	0.0001037234	Bolt Size M10	10.0 - 20.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 4L Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	252	4	19	17	0.005170	10	0.4 - 0.8
WDU4	22	10	600	188	6	18	22	0.003320	10	0.5 - 1.0
WDU6	20	8	550	144	9	15	29	0.002291	12	0.8 - 1.6
WDU10	16	6	550	112	13	13	40	0.001394	12	1.2 - 2.4
WDU16	14	6	600	96	18	11	53	0.000900	16	2.0 - 4.0
WDU35	12	2	600	72	30	8	87	0.000442	18	4.0 - 5.0
WDU70N	6	00	600	45	52	7	134	0.000235	22	8.0 - 12.0
WDU70/95	6	00	600	11	100	6	134	0.000245	30	6.0 - 12.0
WDU120/150	6	000	600	9	139	6	164	0.000170	35	10.0 - 20.0
WFF35 *	14	2	600	22	58	13	76	0.000383	Bolt Size M6	3.0 - 6.0
WFF70 *	14	00	600	9	116	9	116	0.000205	Bolt Size M8	6.0 - 12.0
WFF120 *	10	250MCM	600	7	163	7	163	0.000120	Bolt Size M10	10.0 - 20.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 5 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	249	5	28	17	0.0040291236	10	0.4 - 0.8
WDU4	22	10	600	192	8	25	22	0.0026181954	10	0.5 - 1.0
WDU6	20	8	550	144	11	22	29	0.0017221670	12	0.8 - 1.6
WDU10	16	6	550	120	15	18	40	0.0011158108	12	1.2 - 2.4
WDU16	14	6	600	96	17	10	53	0.0010658108	16	2.0 - 4.0
WDU35	12	2	600	72	31	9	87	0.0004613196	18	4.0 - 5.0
WDU70N	6	00	600	40	57	7	134	0.0002442346	22	8.0 - 12.0
WDU70/95	6	00	600	15	92	7	134	0.0002542346	30	6.0 - 12.0
WDU120/150	6	000	600	12	128	7	162	0.0001657252	35	10.0 - 20.0
WFF35 *	14	2	600	15	73	14	76	0.0004013196	Bolt Size M6	3.0 - 6.0
WFF70 *	14	00	600	12	113	11	116	0.0002142346	Bolt Size M8	6.0 - 12.0
WFF120 *	10	250MCM	600	9	162	10	162	0.0001157252	Bolt Size M10	10.0 - 20.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 6 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	416	4	29	17	0.0047555376	10	0.4 - 0.8
WDU4	22	10	600	320	6	26	22	0.0030714664	10	0.5 - 1.0
WDU6	20	8	550	240	9	23	29	0.0020053720	12	0.8 - 1.6
WDU10	16	6	550	200	12	19	40	0.0012956528	12	1.2 - 2.4
WDU16	14	6	600	160	14	11	53	0.0012456528	16	2.0 - 4.0
WDU35	12	2	600	120	15	9	87	0.0005322736	18	4.0 - 5.0
WDU70N	6	00	600	50	24	7	134	0.0002804136	22	8.0 - 12.0
WDU70/95	6	00	600	19	85	7	134	0.0002904136	30	6.0 - 12.0
WDU120/150	6	000	600	16	116	8	162	0.0001845232	35	10.0 - 20.0
WFF35 *	14	2	600	38	47	14	76	0.0004722736	Bolt Size M6	3.0 - 6.0
WFF70 *	14	00	600	16	99	11	116	0.0002504136	Bolt Size M8	6.0 - 12.0
WFF120 *	10	250MCM	600	12	134	11	162	0.0001345232	Bolt Size M10	10.0 - 12.0
WFF185 *	8	350MCM	600	9	214	9	234	0.0000766280	Bolt Size M12	14.0 - 31.0
WFF300 *	4	500MCM	600	9	257	5	316	0.00006696	Bolt Size M16	25.0 - 60.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 7 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	640	3	32	17	0.0056104710	10	0.4 - 0.8
WDU4	22	10	600	515	7	29	22	0.0036049315	10	0.5 - 1.0
WDU6	20	8	550	380	9	26	29	0.0023386825	12	0.8 - 1.6
WDU10	16	6	550	300	10	21	40	0.0015073130	12	1.2 - 2.4
WDU16	14	6	600	250	11	12	53	0.0014573130	16	2.0 - 4.0
WDU35	12	2	600	190	21	11	87	0.0006157810	18	4.0 - 5.0
WDU70N	6	00	600	93	41	8	134	0.0003229935	22	8.0 - 12.0
WDU70/95	6	00	600	23	82	8	134	0.0003329935	30	6.0 - 12.0
WDU120/150	6	000	600	20	112	9	162	0.0002066470	35	10.0 - 20.0
WFF35 *	14	2	600	46	45	16	76	0.0005557810	Bolt Size M6	3.0 - 6.0
WFF70 *	14	00	600	40	66	13	116	0.0002929935	Bolt Size M8	6.0 - 12.0
WFF120 *	10	250MCM	600	15	148	12	162	0.0001566470	Bolt Size M10	10.0 - 20.0
WFF185 *	8	350MCM	600	11	214	9	234	0.0000875675	Bolt Size M12	14.0 - 31.0
WFF300 *	4	500MCM	600	11	249	6	316	0.000076038	Bolt Size M16	25.0 - 60.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.

Size 8 Terminal Capacity Data										
Terminal Type	Conductor Size (AWG)		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	912	3	35	17	0.0064207020	10	0.4 - 0.8
WDU4	22	10	600	720	4	32	22	0.0041105030	10	0.5 - 1.0
WDU6	20	8	550	540	6	29	29	0.0026545650	12	0.8 - 1.6
WDU10	16	6	550	438	9	23	40	0.0017079060	12	1.2 - 2.4
WDU16	14	6	600	360	10	13	53	0.0016579060	16	2.0 - 4.0
WDU35	12	2	600	270	18	12	87	0.0006949220	18	4.0 - 5.0
WDU70N	6	00	600	108	40	9	134	0.0003633470	22	8.0 - 12.0
WDU70/95	6	00	600	56	55	9	134	0.0003733470	30	6.0 - 12.0
WDU120/150	6	000	600	46	78	10	162	0.0002276140	35	10.0 - 20.0
WFF35 *	14	2	600	84	34	17	76	0.0006349220	Bolt Size M6	3.0 - 6.0
WFF70 *	14	00	600	11	133	14	116	0.0003333470	Bolt Size M8	6.0 - 12.0
WFF120 *	10	250MCM	600	36	100	13	162	0.0001776140	Bolt Size M10	10.0 - 20.0
WFF185 *	8	350MCM	600	13	225	13	234	0.0000979350	Bolt Size M12	14.0 - 31.0
WFF300 *	4	500MCM	600	13	243	7	316	0.0000846370	Bolt Size M16	25.0 - 60.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C

Size 9 Terminal Capacity Data										
Terminal Type	Conductor Size mm <sup>2</sup>		Max. Volts	Maximum Physical Terminal Content		Reduced Terminal Content at Maximum Terminal Amps		Combined Terminal Resistance (Ohms)	Insulation Stripping Length (mm)	Terminal Tightening Torque (Nm)
	Min	Max		Term. Qty.	Amps	Term. Qty.	Amps			
WDU2.5	22	10	550	1232	2	37	17	0.0072476964	10	0.4 - 0.8
WDU4	22	10	600	980	4	35	22	0.0046265346	10	0.5 - 1.0
WDU6	20	8	550	735	6	31	29	0.0029769830	12	0.8 - 1.6
WDU10	16	6	550	595	8	25	40	0.0019126492	12	1.2 - 2.4
WDU16	14	6	600	490	9	15	53	0.0018626492	16	2.0 - 4.0
WDU35	12	2	600	371	16	13	87	0.0007757004	18	4.0 - 5.0
WDU70N	6	00	600	172	33	10	134	0.0004045354	22	8.0 - 12.0
WDU70/95	6	00	600	64	54	10	134	0.0004145354	30	6.0 - 12.0
WDU120/150	6	000	600	54	76	12	162	0.0002490148	35	10.0 - 20.0
WFF35 *	14	2	600	96	33	19	76	0.0007157004	Bolt Size M6	3.0 - 6.0
WFF70 *	14	00	600	81	51	15	116	0.0003745354	Bolt Size M8	6.0 - 12.0
WFF120 *	10	250MCM	600	42	97	15	162	0.0001990148	Bolt Size M10	10.0 - 20.0
WFF185 *	8	350MCM	600	32	151	13	234	0.0001085170	Bolt Size M12	14.0 - 31.0
WFF300 *	4	500MCM	600	32	162	8	316	0.0000934134	Bolt Size M16	25.0 - 60.0

\* Complete with cover

**Note:** Terminals listed are only suitable for a minimum operating temperature of -50°C.