



Automation for a Changing World

Direct-drive Permanent Magnet Synchronous Torque Motor MST Series

MST Specification 15kW~280kW



Our Mission:

To provide innovative, clean and energy-efficient solutions for a better tomorrow.

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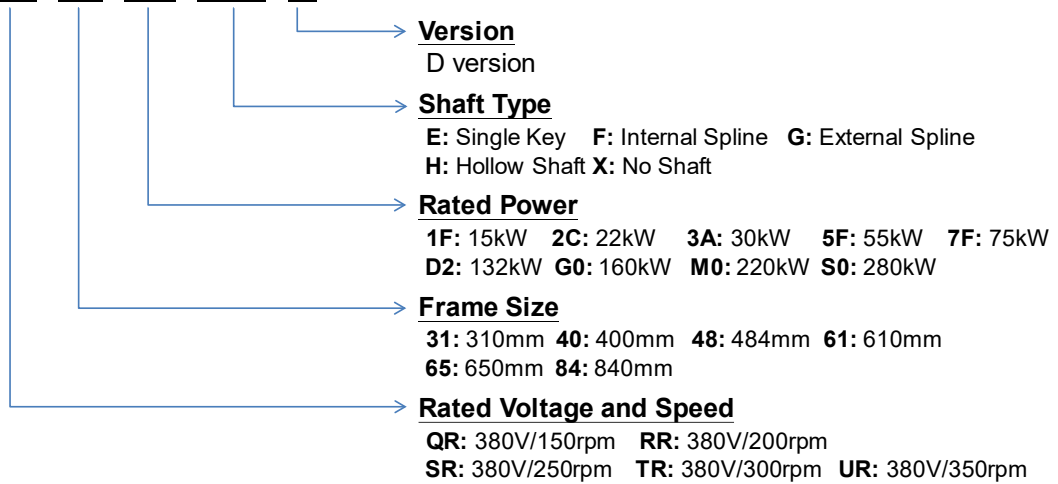
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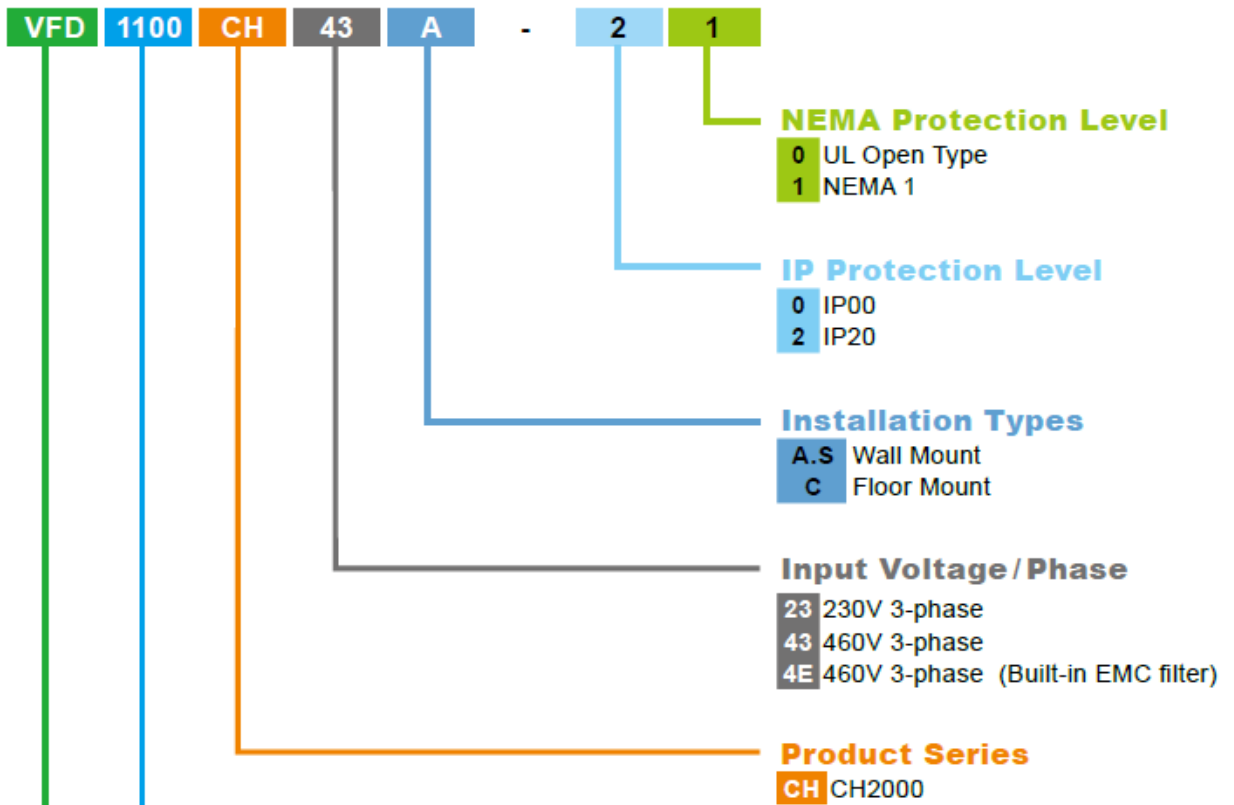
1. Model Naming

■ MST Torque Motor

MST - TR 40 2C F86 D



■ CH2000 Driver



Applicable Motor Capacity

007	0.75 kW	075	7.5 kW	300	30 kW	900	90 kW	2200	220 kW
015	1.5 kW	110	11 kW	370	37 kW	1100	110 kW	2800	280 kW
022	2.2 kW	150	15 kW	450	45 kW	1320	132 kW		
037	3.7 kW	185	18.5 kW	550	55 kW	1600	160 kW		
055	5.5 kW	220	22 kW	750	75 kW	1850	180 kW		

Product
Variable Frequency Drive

2. Motor & Driver List and Selection Reference Table

■ Motor & Driver List

MST Torque Motor					
Model Name	Rated Power	Rated Torque	Rated Speed	Rated Current	Overload Ability
	kW	Nm	rpm	A	
MST-UR311FF75D	15	410	350	30	140% · Duty=50% 160% · Duty=40% 180% · Duty=30% 200% · Duty=25%
MST-TR402CF86D	22	700	300	43	
MST-SR403AF86D	30	1147	250	60	
MST-SR485FxA0D	55	2100	250	105	
MST-SR617FxB0D	75	2865	250	142	
MST-RR617FxB0D	75	3581	200	144	
MST-QR65D2xC5D	132	8403	150	242	
MST-RR65G0xC5D	160	7640	200	326	
MST-QR84G0xG0D	160	10200	150	324	
MST-QR84M0xI0D	220	14006	150	413	
MST-QR84S0xI0D	280	17826	150	505	

◇ There are four shaft type on 55~280kW, x → X: No Shaft · E: Single Key · F: Internal Spline · G: External Spline

CH2000 Driver						
Model Name	Rated Power	Rated Current	150% Current (60 sec)	200% Current (3 sec)	PG Card	Power Cable Magnetic Ring
	kW	A	A	A		
VFD150CH43A-21	15	32	48	64	EMC-PG01R	4140930561 Quantity: 3
VFD185CH43A-21	18.5	38	57	76		
VFD220CH43A-21	22	45	67.5	90		
VFD300CH43A-21	30	60	90	120		
VFD370CH43A-21	37	73	109.5	146		
VFD450CH43A-21	45	91	136.5	182		
VFD550CH43A-21	55	110	165	220		
VFD750CH43A-21	75	150	225	300		
VFD900CH43A-21	90	180	270	360		
VFD1100CH43A-21	110	220	330	440		
VFD1320CH43A-21	132	250	375	500		
VFD1600CH43A-21	160	310	465	620		4140930561 Quantity: 9
VFD1850CH43A-21	185	370	555	740		
VFD2200CH43A-21	220	440	660	880		
VFD2800CH43C-21	280	550	825	1100		

■ Selection Reference Table

There are 11 MST motors specially designed for the melt action of **injection molding machines**. In order to facilitate customer selection, there are two types of table for reference:

Reference 1

The MST motor power is arranged from small to large, and follow the compared screw diameter and clamping force specifications of the injection molding machines, as shown in the following table. Evaluation conditions: screw L/D=20, material viscosity: medium to high viscosity, load time ratio (DUTY) = 30%

MST Torque Motor Model Name	Power	Rated Torque	Rated Rotating Speed	Screw Diameter	Mold Clamping Force
Unit	kW	Nm	rpm	mm	ton
MST-UR311FF75D	15	410	350	40~50	150~200
MST-TR402CF86D	22	700	300	50~65	200~350
MST-SR403AF86D	30	1147	250		
MST-SR485FxA0D	55	2100	250	65~80	350~600
MST-SR617FxB0D	75	2865	250	80~110	600~800
MST-RR617FxB0D	75	3581	200		
MST-QR65D2xC5D	132	8403	150	110~140	800~1300
MST-RR65G0xC5D	160	7640	200		
MST-QR84G0xG0D	160	10200	150	140~175	1300~2500
MST-QR84M0xI0D	220	14006	150		
MST-QR84S0xI0D	280	17826	150		

The actual application needs to be adjusted according to the material viscosity and DUTY. If the material is thicker and the DUTY is longer, should choose bigger motor. Otherwise, choose small.

Reference 2

The screw diameter is arranged from small to big, and compares the four different viscosity materials to summarize the appropriate MST motor power recommendations. Evaluation conditions: screw L/D=20, load time proportion(DUTY)=30%

	Screw Diameter	40	45	50	55	60	65	70	75	80	mm	
	Mold Clamping Force	120~180	120~200	180~250	200~300	220~350	250~400	300~450	350~600	400~800	ton	
Plastic Material	Low Viscosity	15	15	15	15	15 ↑	22 ↓	22	22 ↑	30	PP, PE	Material
	Medium Viscosity	15	15	22 ↓	22	22 ↑	30	30 ↑	55	55	PC, PMMA	
	High Viscosity	15	22 ↓	22 ↑	30	30 ↑	55	55	55	55 ↑	PVC-H, PETP+PC	
	Super High Viscosity	22	30	30 ↑	55	55	55 ↑	75SR	75RR	75RR ↑	Thermoset	

	Screw Diameter	90	100	110	120	130	140	150	175	200	mm	
	Mold Clamping Force	450 ~ 1000	600 ~ 1200	800 ~ 1400	1000 ~ 1800	1200 ~ 2000	1400 ~ 2200	1600 ~ 2700	2000 ~ 3600	3000 ~ 4000	ton	
Plastic Material	Low Viscosity	30 ↑	55	55 ↑	75SR	75RR	132 ↓	132 ↓	132	220 ↓	PP, PE	Material
	Medium Viscosity	55 ↑	75SR ↑	75RR ↑	132 ↓	132 ↓	132	132 ↑	220	280 ↑	PC, PMMA	
	High Viscosity	75SR ↑	75RR ↑	132 ↓	132 ↓	132	132 ↑	160QR ↑	220 ↑	X	PVC-H, PETP+PC	
	Super High Viscosity	132 ↓	132	160QR ↑	220	220 ↑	280	X	X	X	Thermoset	

Background color description for the selection reference table above:

Green : The power of the drive is same as the motor

Blue(with an arrow down behind the number) : The power of the drive can less than the motor one level

Orange(with an arrow up behind the number) : The power of the drive needs to greater than the motor on level

There are two motor types for 75kW and 160kW, so that the speed is added to the table to distinguish them:

Ex: 75kW/250rpm = MST-SR617FxB0D 、 75kW/200rpm = MST-RR617FxB0D

3. Product Technical Information

■ Motor Spec. (MST Series)

Model Name		MST-UR311FF75D	MST-TR402CF86D	MST-SR403AF86D
Voltage	VAC	380	380	380
Power	kW	15	22	30
No. of Poles	P	16	24	24
Rated Torque	Nm	410	700	1147
Max. Torque	Nm	905	1711	2719
Rated Speed	rpm	350	300	250
Rated Frequency	Hz	46.67	60	50
Max. Speed	rpm	500	500	300
Rated Current	A	30	43	60
Max. Current	A	72	113	147
KT	Nm/A	13.6	16.3	19.1
KE	V/krpm	918	1065	1300
Winding Resistance	ohm	1.357	0.867	0.719
Winding Inductance	mH	14.16	8.4	9.84
Moment of inertia	kg-m ²	1.57 × 10 ⁻¹	3.47 × 10 ⁻¹	6.34 × 10 ⁻¹
Weight	kg	145	209	274
Shaft Height	mm	167.5	206	206
Shaft Type	mm	Internal Spline	Internal Spline	Internal Spline
Outer Diameter	mm	312	400	400
Length	mm	337	337	457
Insulation Class		Class F	Class F	Class F
Protection Class		IP54	IP54	IP54
Cooling Method	Forced Oil Cooling Max. Oil Temperature 40°C			
	Min. Cooling Flow Rate 11.6LPM	Min. Cooling Flow Rate 27.8LPM	Min. Cooling Flow Rate 17.7LPM	
Encoder	Resolver (2 Poles)			
Motor Temperature Sensor	KTY84-130			
Operation Ambient	Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting	Flange (IM B14)			
Certificate	CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST-SR485FXA0D	MST-SR485FEA0D	MST-SR485FFA0D	MST-SR485FGA0D
Voltage	VAC	380			
Power	kW	55			
No. of Poles	P	32			
Rated Torque	Nm	2100			
Max. Torque	Nm	4947			
Rated Speed	rpm	250			
Rated Frequency	Hz	66.67			
Max. Speed	rpm	350			
Rated Current	A	105			
Max. Current	A	284			
KT	Nm/A	20.0			
KE	V/krpm	1380			
Winding Resistance	ohm	0.33			
Winding Inductance	mH	3.95			
Moment of inertia	kg-m ²	1.4			
Weight	kg	423			
Shaft Height	mm	257			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	484			
Length	mm	477			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 28.6LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14)			
Certificate		CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST-SR617FXB0D	MST-SR617FEB0D	MST-SR617FFB0D	MST-SR617FGB0D
Voltage	VAC	380			
Power	kW	75			
No. of Poles	P	64			
Rated Torque	Nm	2865			
Max. Torque	Nm	8850			
Rated Speed	rpm	250			
Rated Frequency	Hz	133.3			
Max. Speed	rpm	350			
Rated Current	A	142			
Max. Current	A	519			
KT	Nm/A	20.2			
KE	V/krpm	1342			
Winding Resistance	ohm	0.197			
Winding Inductance	mH	1.99			
Moment of inertia	kg-m ²	4.49			
Weight	kg	531			
Shaft Height	mm	320			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	610			
Length	mm	425			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 71.1LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14)			
Certificate		CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST-RR617FXB0D	MST-RR617FEB0D	MST-RR617FFB0D	MST-RR617FGB0D
Voltage	VAC	380			
Power	kW	75			
No. of Poles	P	64			
Rated Torque	Nm	3581			
Max. Torque	Nm	10956			
Rated Speed	rpm	200			
Rated Frequency	Hz	106.7			
Max. Speed	rpm	300			
Rated Current	A	144			
Max. Current	A	519			
KT	Nm/A	24.9			
KE	V/krpm	1664			
Winding Resistance	ohm	0.237			
Winding Inductance	mH	2.47			
Moment of inertia	kg-m ²	5.23			
Weight	kg	595			
Shaft Height	mm	320			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	610			
Length	mm	485			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 81.1LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14)			
Certificate		CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST-QR65D2XC5D	MST-QR65D2EC5D	MST-QR65D2FC5D	MST-QR65D2GC5D
Voltage	VAC	380			
Power	kW	132			
No. of Poles	P	64			
Rated Torque	Nm	8403			
Max. Torque	Nm	15306			
Rated Speed	rpm	150			
Rated Frequency	Hz	80			
Max. Speed	rpm	200			
Rated Current	A	242			
Max. Current	A	484			
KT	Nm/A	34.7			
KE	V/krpm	2495			
Winding Resistance	ohm	0.146			
Winding Inductance	mH	1.740			
Moment of inertia	kg-m ²	9.53			
Weight	kg	870			
Shaft Height	mm	325			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	650			
Length	mm	687			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 63.1LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14) / Foot (IM B3)			
Certificate		CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST-RR65G0XC5D	MST-RR65G0EC5D	MST-RR65G0FC5D	MST-RR65G0GC5D
Voltage	VAC	380			
Power	kW	160			
No. of Poles	P	64			
Rated Torque	Nm	7640			
Max. Torque	Nm	17762			
Rated Speed	rpm	200			
Rated Frequency	Hz	106.7			
Max. Speed	rpm	300			
Rated Current	A	326			
Max. Current	A	793			
KT	Nm/A	23.4			
KE	V/krpm	1754			
Winding Resistance	ohm	0.076			
Winding Inductance	mH	0.91			
Moment of inertia	kg-m ²	9.61			
Weight	kg	871			
Shaft Height	mm	325			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	650			
Length	mm	692			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 64.3LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14) / Foot (IM B3)			
Certificate		CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST- QR84G0XG0D	MST- QR84G0EG0D	MST- QR84G0FG0D	MST- QR84G0GG0D
Voltage	VAC	380			
Power	kW	160			
No. of Poles	P	48			
Rated Torque	Nm	10200			
Max. Torque	Nm	24900			
Rated Speed	rpm	150			
Rated Frequency	Hz	60			
Max. Speed	rpm	250			
Rated Current	A	324			
Max. Current	A	837			
KT	Nm/A	31.5			
KE	V/krpm	2193			
Winding Resistance	ohm	0.066			
Winding Inductance	mH	1.35			
Moment of inertia	kg-m ²	23.1			
Weight	kg	1176			
Shaft Height	mm	420			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	840			
Length	mm	588			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 106.7LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14) / Foot (IM B3)			
Certificate		CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST-QR84M0XI0D	MST-QR84M0EI0D	MST-QR84M0FI0D	MST-QR84M0GI0D
Voltage	VAC	380			
Power	kW	220			
No. of Poles	P	48			
Rated Torque	Nm	14006			
Max. Torque	Nm	33654			
Rated Speed	rpm	150			
Rated Frequency	Hz	60			
Max. Speed	rpm	250			
Rated Current	A	413			
Max. Current	A	1115			
KT	Nm/A	33.9			
KE	V/krpm	2223			
Winding Resistance	ohm	0.048			
Winding Inductance	mH	1.03			
Moment of inertia	kg-m ²	30			
Weight	kg	1430			
Shaft Height	mm	420			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	840			
Length	mm	718			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 131LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14) / Foot (IM B3)			
Certificate		CE			

*Note: The max. Speed listed above is operating with the Field Weakening Control.


DELTA MST 15kW~280kW Specification

Model		MST-QR84S0X10D	MST-QR84S0E10D	MST-QR84S0F10D	MST-QR84S0G10D
Voltage	VAC	380			
Power	kW	280			
No. of Poles	P	48			
Rated Torque	Nm	17826			
Max. Torque	Nm	45096			
Rated Speed	rpm	150			
Rated Frequency	Hz	60			
Max. Speed	rpm	250			
Rated Current	A	505			
Max. Current	A	1434			
KT	Nm/A	35.3			
KE	V/krpm	2317			
Winding Resistance	ohm	0.037			
Winding Inductance	mH	0.83			
Moment of inertia	kg-m ²	36.5			
Weight	kg	1678			
Shaft Height	mm	420			
Shaft Type	-	No Shaft	Single Key	Internal Spline	External Spline
Outer Diameter	mm	840			
Length	mm	928			
Insulation Class		Class F			
Protection Class		IP54			
Cooling Method		Forced Oil Cooling Max. Oil Temperature 40°C Min. Cooling Flow Rate 156.8LPM			
Encoder		Resolver (2 Poles)			
Motor Temperature Sensor		KTY84-130			
Operation Ambient		Temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) , Altitude <1000m			
Mounting		Flange (IM B14) / Foot (IM B3)			
Certificate		CE			



*Note: The max. Speed listed above is operating with the Field Weakening Control.

■ Driver Spec. (CH2000 Series)

Frame Size		B	C			D0-2	D2			E2		F2	G2			H3	
Model Name VFD_____CH43A-21		150	185	220	300	370	450	550	750	900	1100	1320	1600	1850	2200	2800	
Output Rating	Super Heavy Duty	Rated Output Capacity [kVA]	25	30	36	48	58	73	88	120	143	175	199	247	295	359	438
		Rated Output Current [A]	32	38	45	60	73	91	110	150	180	220	250	310	370	450	550
		Applicable Motor Output [kW]	15	18.5	22	30	37	45	55	75	90	110	132	160	185	220	280
		Applicable Motor Output [HP]	20	25	30	40	50	60	75	100	125	150	175	215	250	300	375
		Overload Tolerance	Rated output current is 150% for 60 sec.; Rated output current is 200% for 3 sec.														
		Max. Output Frequency [Hz]	0.00~599.00														
		Carrier Frequency [kHz]	5~15 kHz									4~10 kHz					
Input Rating	Input Current [A] Super Heavy Duty	35	40	47	63	74	101	114	157	167	207	240	300	380	400	494	
	Rated Voltage/Frequency	3 相 380~480V _{AC} (-15% ~ +10%) · 50/60 Hz															
	Operating Voltage Range	323~528 V _{AC}															
	Frequency Tolerance	47~63 Hz															
	Efficiency [%]	97.8									98.2						
	Power Factor	>0.98															
	Drive Weight [Kg]	5.4 ± 1	9.8 ± 2				38.5 ± 1.5				64.8 ± 1.5	86.5 ± 1.5	134 ± 4			228	
Cooling Method	Fan cooling																
Braking Chopper	Built-in					Optional											
DC choke	Optional					Built-in											
EMC Filter	Optional					Optional											

*Note: The max. Speed listed above is operating with the Field Weakening Control.

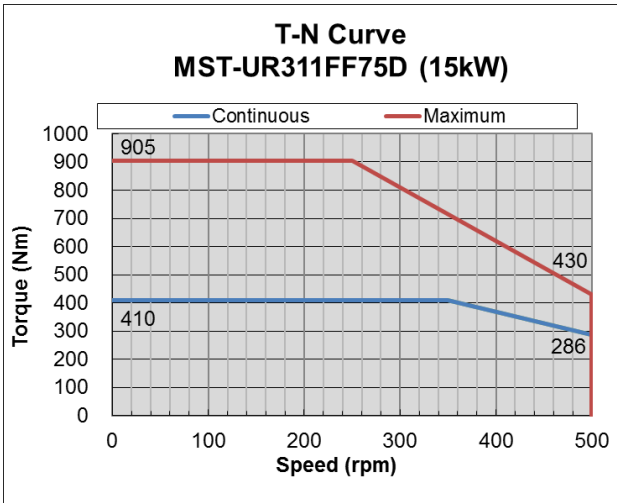
General Specifications

Control Characteristics	Control Method	1: V/F, 2: SVC, 3: VF+PG, 4: FOC+PG, 5: TQC+PG
	Starting Torque	Reach up to 200% or above at 0.5Hz. Under FOC+PG mode, starting torque can reach 200% at 0Hz.
	V/F Curve	4 point adjustable V/F curve and square curve
	Speed Response Ability	5 Hz (vector control can reach up to 40Hz)
	Torque Limit	230V / 460V model: Max. 220% torque current
	Torque Accuracy	±5%
	Max. Output Frequency [Hz]	0.00~599.00 Hz
	Frequency Output Accuracy	Digital command: ±0.01%, -10°C~ +40°C; Analog command: ±0.1%, 25 ±10°C
	Output Frequency Resolution	Digital command: 0.1 Hz; Analog command: max. output frequency (Pr. 01-00) (±11 bit)
	Overload Tolerance	Rated output current is 150% for 1 minute every 5 minutes; Rated output current is 200% for 3 seconds every 30 seconds
	Frequency Setting Signal	-10~ +10 V, 0~ +10 V, 4~20 mA, 0~20 mA, pulse input
	Accel./decel. Time	0.00~600.00 / 0.0~6000.0 seconds
Main Control Function	Torque control, Speed/torque control switching, Feed forward control, Zero-servo control, Restart after instantaneous power failure, Speed search, Over-torque detection, Torque limit, 16-step speed (include main speed), Accel/decel time switch, S-curve accel/decel, 3-wire control, Auto-tuning (rotational, stationary), Dwell, Slip compensation, Torque compensation, JOG frequency, frequency upper/lower limit settings, DC injection braking at start/stop, High slip braking, PID control (with sleep function), Energy saving control, Modbus communication (RS-485 RJ45, max. 115.2 Kbps), Fault restart, and Parameter copy	
Fan Control	230V model: VFD150CH23A-21(include) and series above: PWM control; VFD110CH23A-21(include) and series below: on/off switch control 460V model: VFD185CH43A/4EA-21(include) and series above: PWM control; VFD150CH43A/4EA-21(include) and series below: on/off switch control	
Protection Characteristics	Motor Protection	Electronic thermal relay protection
	Over-current Protection	230V / 460V model: Over-current protection for 300% rated current current clamp ƒ Super heavy duty: 220% ƒ
	Over-voltage Protection	230V model: drive will stop when DC bus voltage exceeds 410V 460V model: drive will stop when DC bus voltage exceeds 820V
	Over-temperature Protection	Built-in temperature sensor
	Stall Prevention	Stall prevention during acceleration, deceleration and running independently
	Restart After Instantaneous Power Failure	Parameter setting up to 20 seconds
	Grounding Leakage Current Protection	Leakage current is higher than 50% of rated current of the AC motor drive
	Short-circuit Current Rating (SCCR)	According to UL 508C, matching fuses are suitable for power systems with short-circuit capacity below 100kA
International Certifications	  GB/T12668-2	

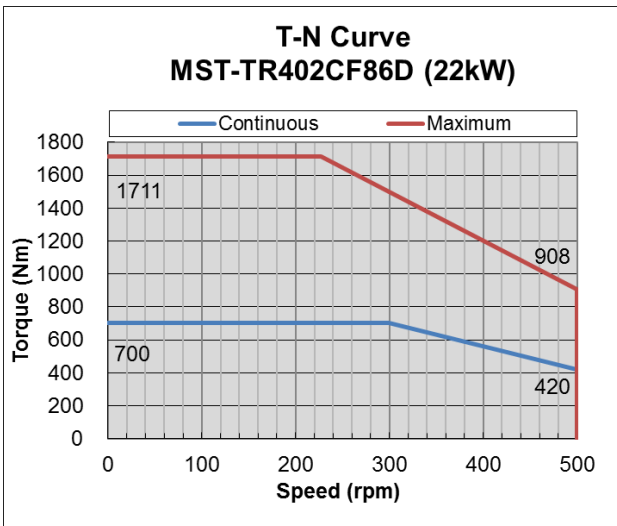
*Note: Please refer to the manual of CH2000 series driver for the detailed specifications above.

4. Motor Characteristic Curve

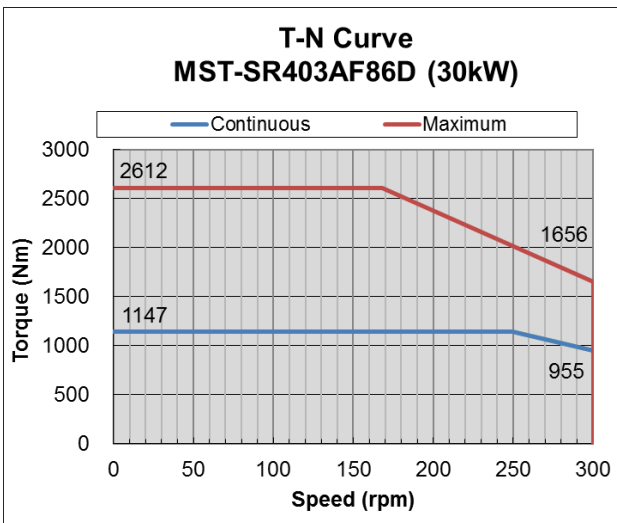
(Overload & Duty introduction on page 22)



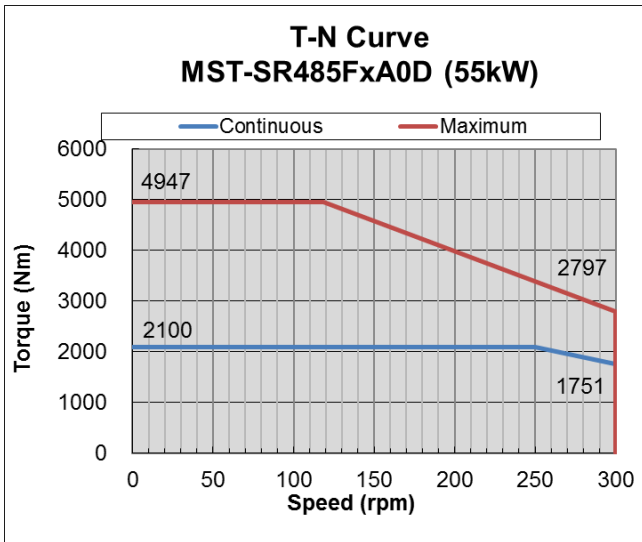
Overload (%)	Torque (Nm)	Duty (%)
120	492	70
140	574	50
160	656	40
180	738	30
200	820	25
220	902	15



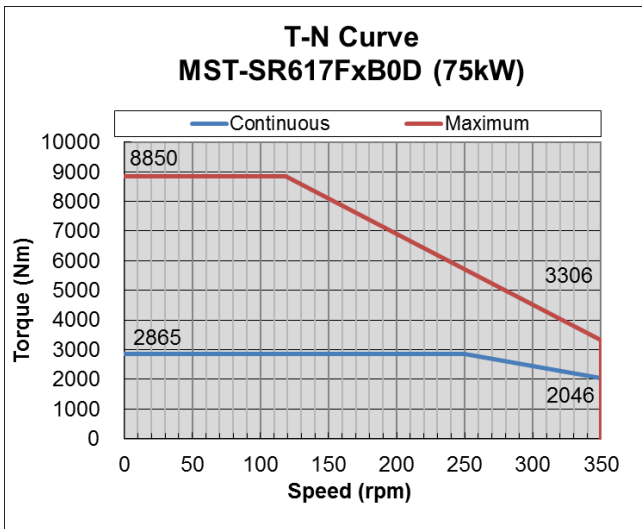
Overload (%)	Torque (Nm)	Duty (%)
120	840	70
140	980	50
160	1120	40
180	1260	30
200	1400	25
220	1540	15
250	1750	10



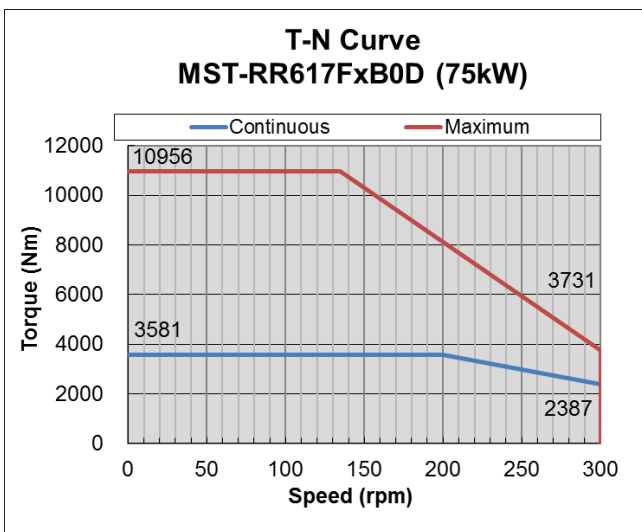
Overload (%)	Torque (Nm)	Duty (%)
120	1376	70
140	1606	50
160	1835	40
180	2064	30
200	2294	25
220	2523	15
250	2867	10



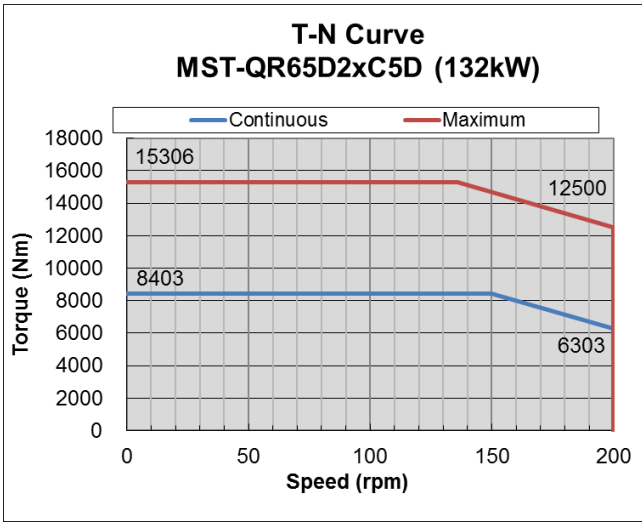
Overload (%)	Torque (Nm)	Duty (%)
120	2520	70
140	2940	50
160	3360	40
180	3780	30
200	4200	25
220	4620	15
250	5250	10



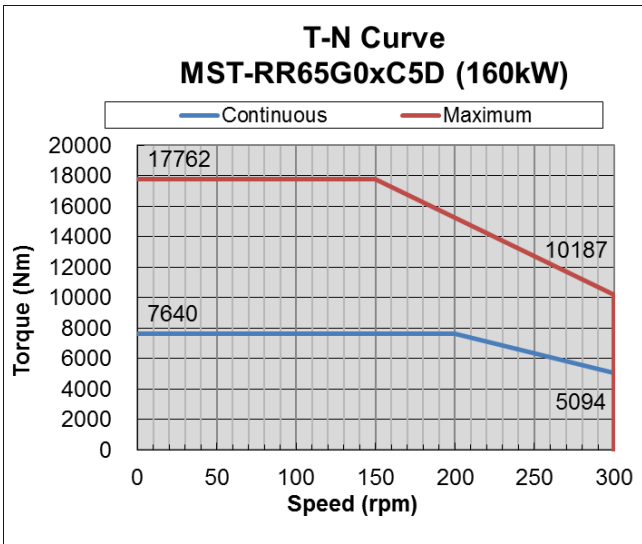
Overload (%)	Torque (Nm)	Duty (%)
120	3438	70
140	4011	50
160	4584	40
180	5157	30
200	5730	25
220	6303	15
250	7163	10



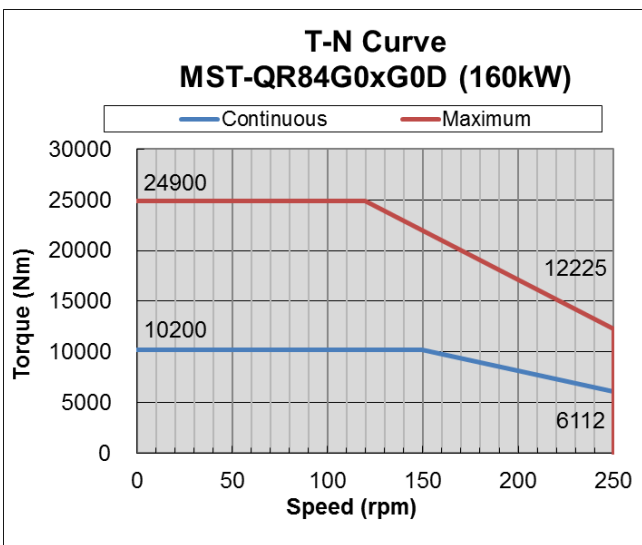
Overload (%)	Torque (Nm)	Duty (%)
120	4297	70
140	5013	50
160	5730	40
180	6446	30
200	7162	25
220	7878	15
250	8953	10



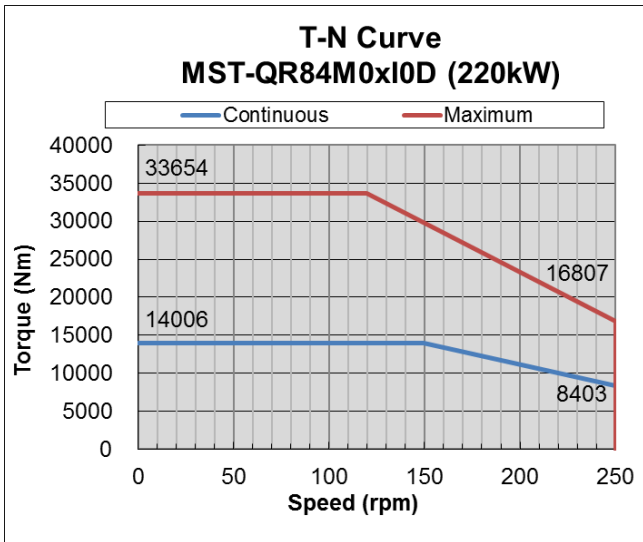
Overload (%)	Torque (Nm)	Duty (%)
120	9945	70%
140	11603	50%
160	13260	40%
180	14918	30%
200	16576	25%



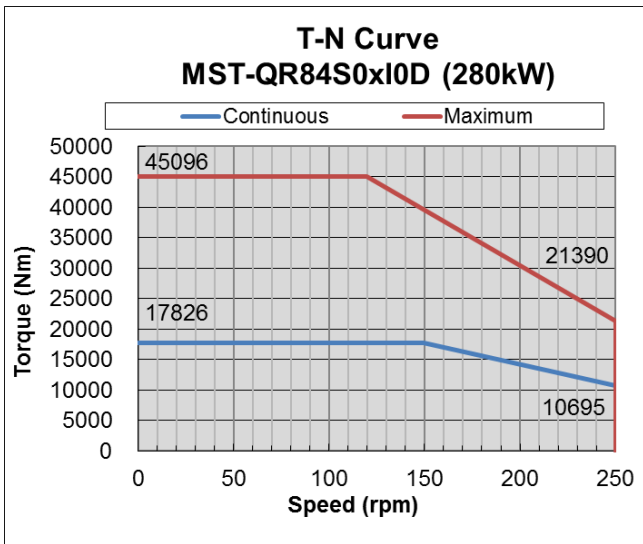
Overload (%)	Torque (Nm)	Duty (%)
120	9168	70
140	10696	50
160	12224	40
180	13752	30
200	15280	25
220	16808	15



Overload (%)	Torque (Nm)	Duty (%)
120	12240	70
140	14280	50
160	16320	40
180	18360	30
200	20400	25
220	22440	15

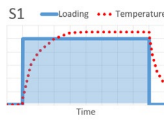
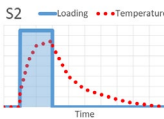
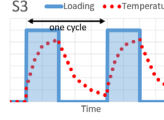
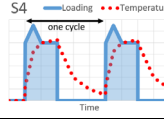


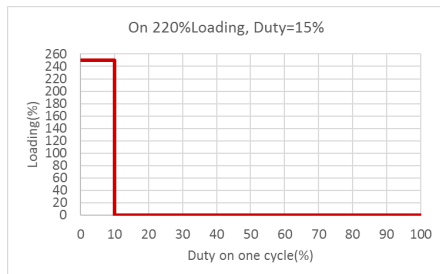
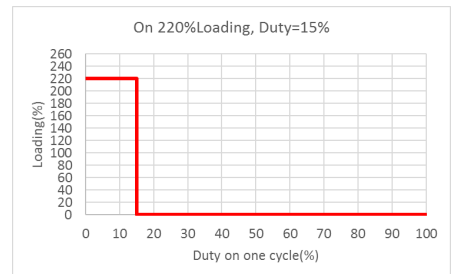
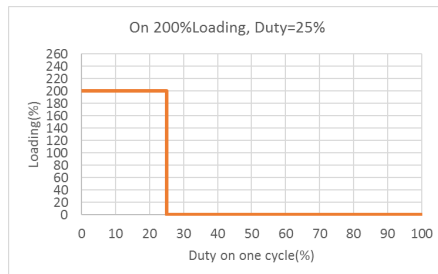
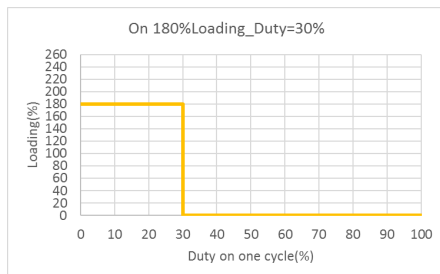
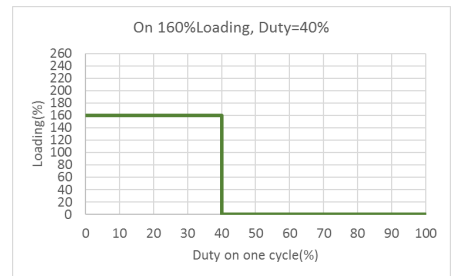
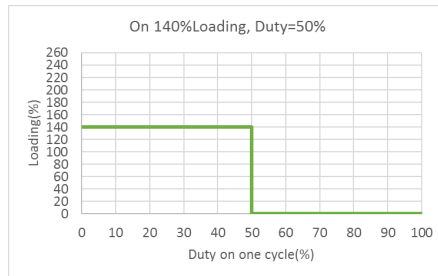
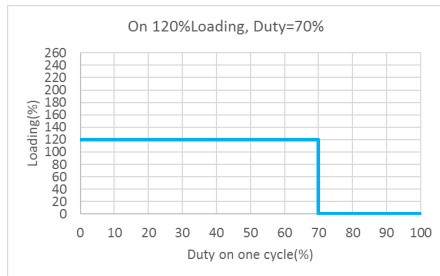
Overload (%)	Torque (Nm)	Duty (%)
120	16807	70
140	19608	50
160	22410	40
180	25211	30
200	28012	25
220	30813	15



Overload (%)	Torque (Nm)	Duty (%)
120	21391	70
140	24956	50
160	28521	40
180	32087	30
200	35652	25
220	39217	15
250	44565	10

Overload & Duty Introduction

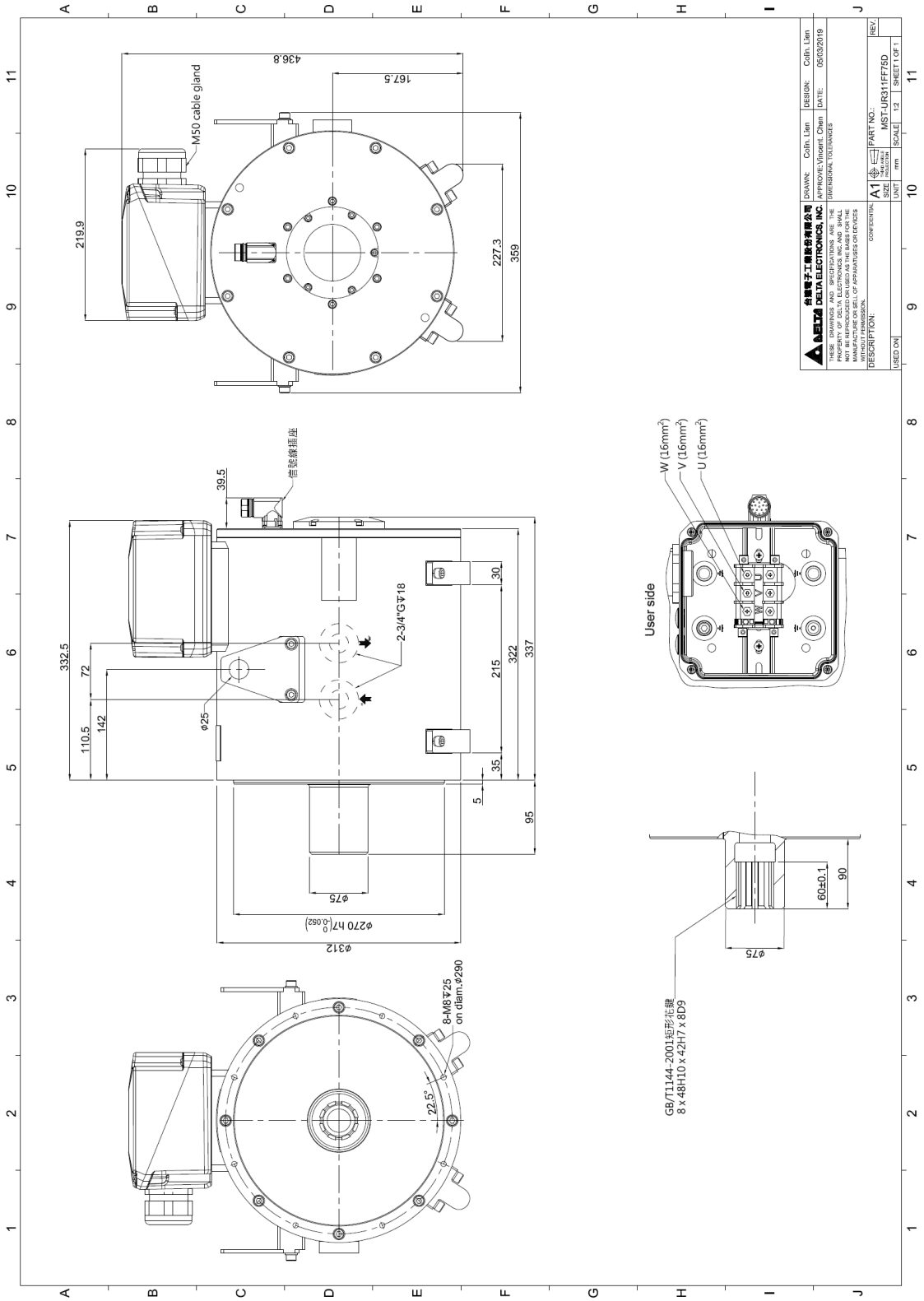
Duty Cycles According to IEC 34 Standard			
S1	Continuous Duty	Works at constant load for enough time to reach thermal equilibrium	
S2	Short-time Duty	Short time operation at constant load, and rest for the motor to reach ambient temperature	
S3	Intermittent periodic Duty	Sequential, identical run and rest cycles with constant load	
S4	Intermittent periodic Duty with Starting	Similar S3, but starting current affects temperature rise.	



These figures show the different loading's duty on S4. Test verification is considered and for easy to read, just show one simple period. For user reference.

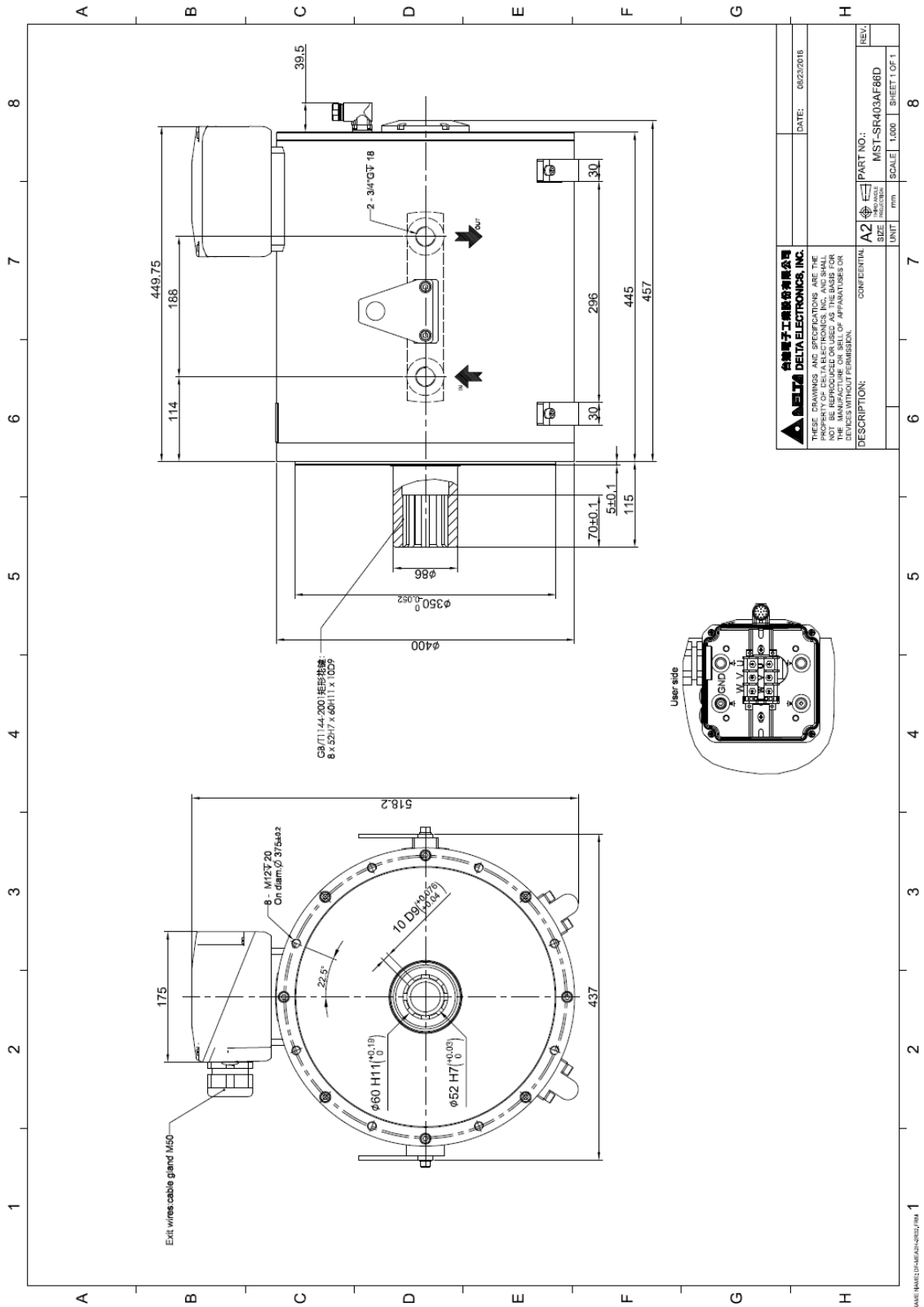
5. Dimensions

MST-UR311FF75D

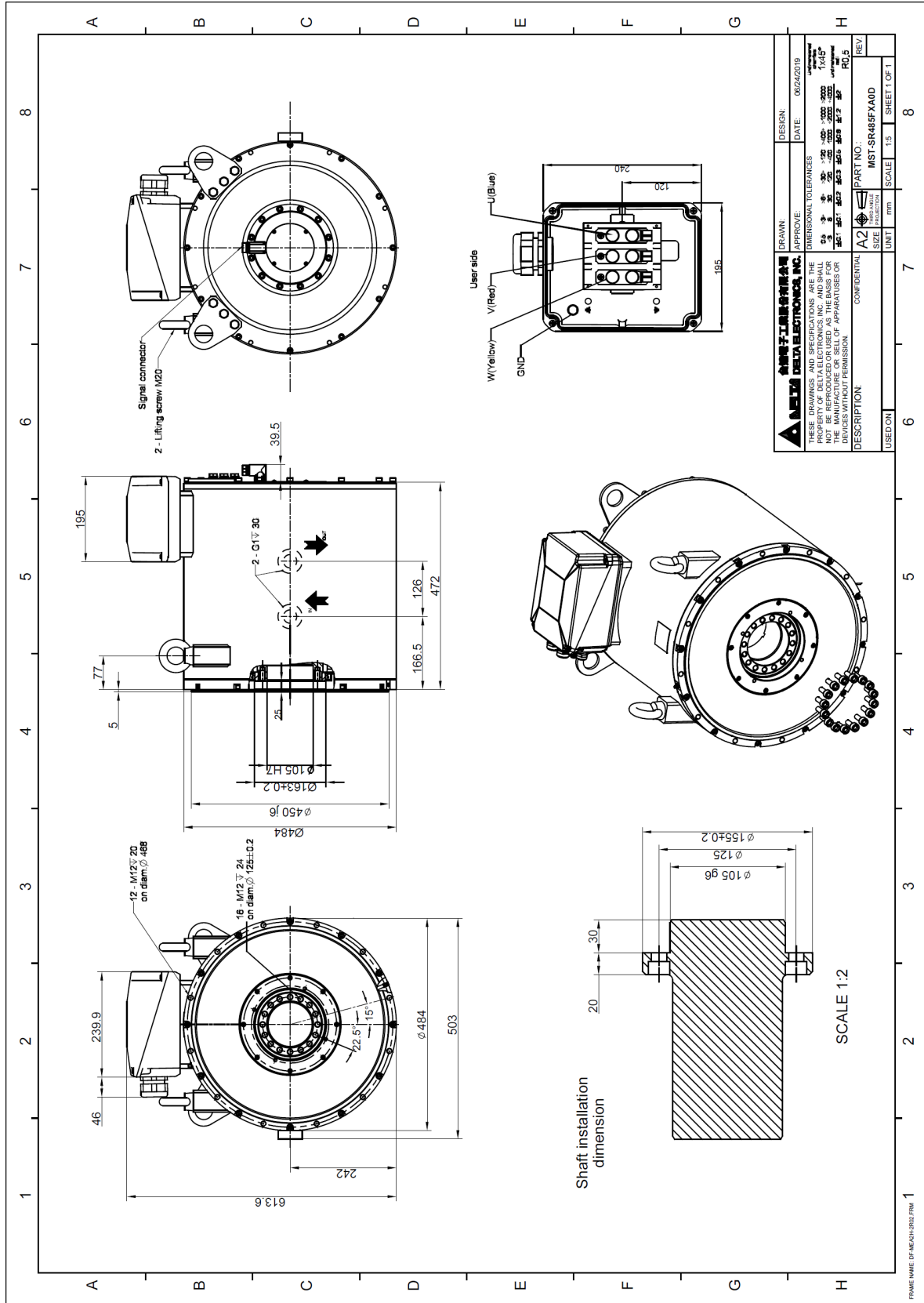


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APPROVE: Vincent Chen	DESIGNER: Colin Lam
APPROVE: Vincent Chen	DATE: 05/03/2019
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DESCRIPTION: CONFIDENTIAL	
PART NO.: MST-UR311FF75D	REV.:
UNIT: mm	SCALE: 1:2
SHEET: 11	OF 11

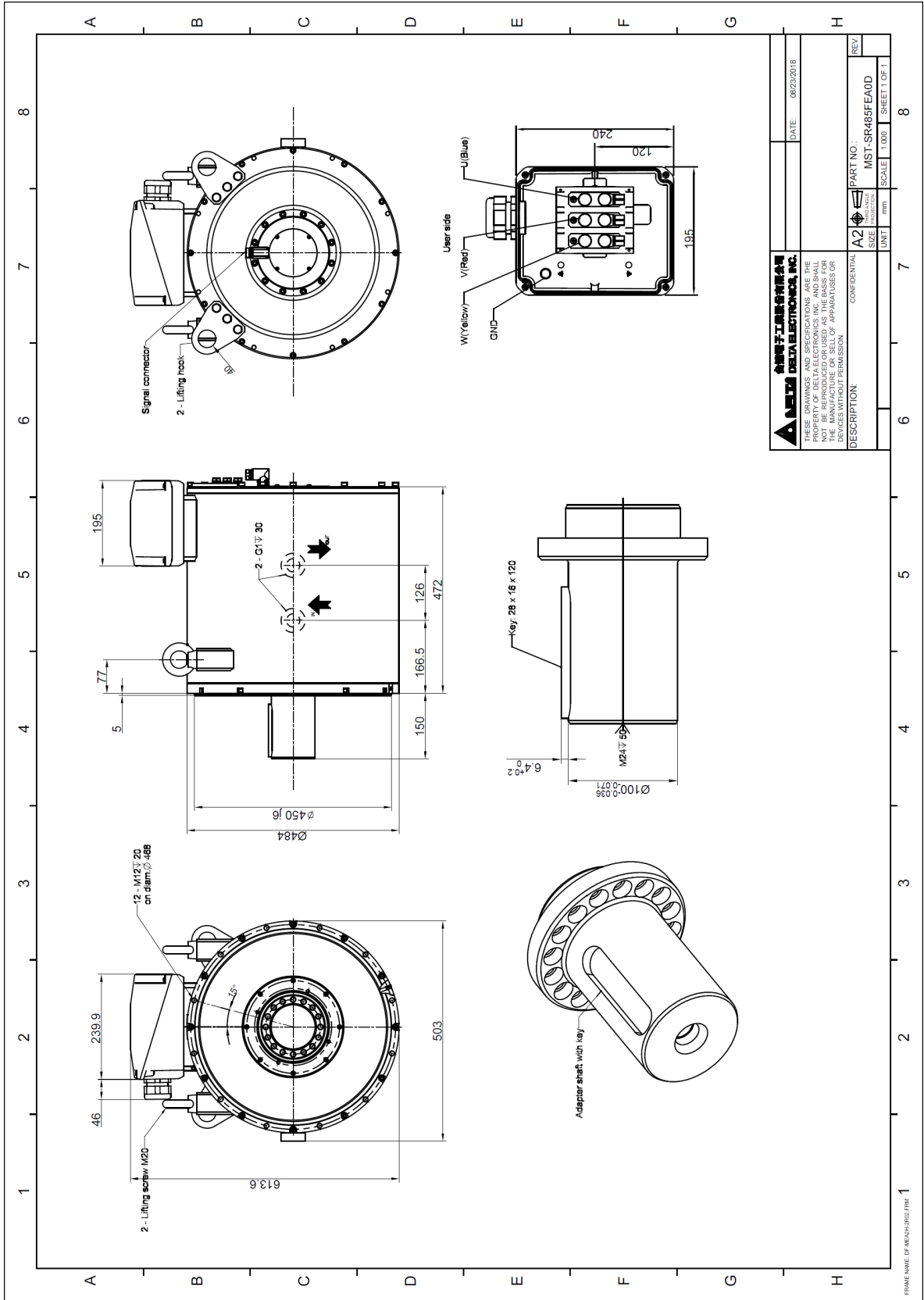
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MST-SR485FXA0D

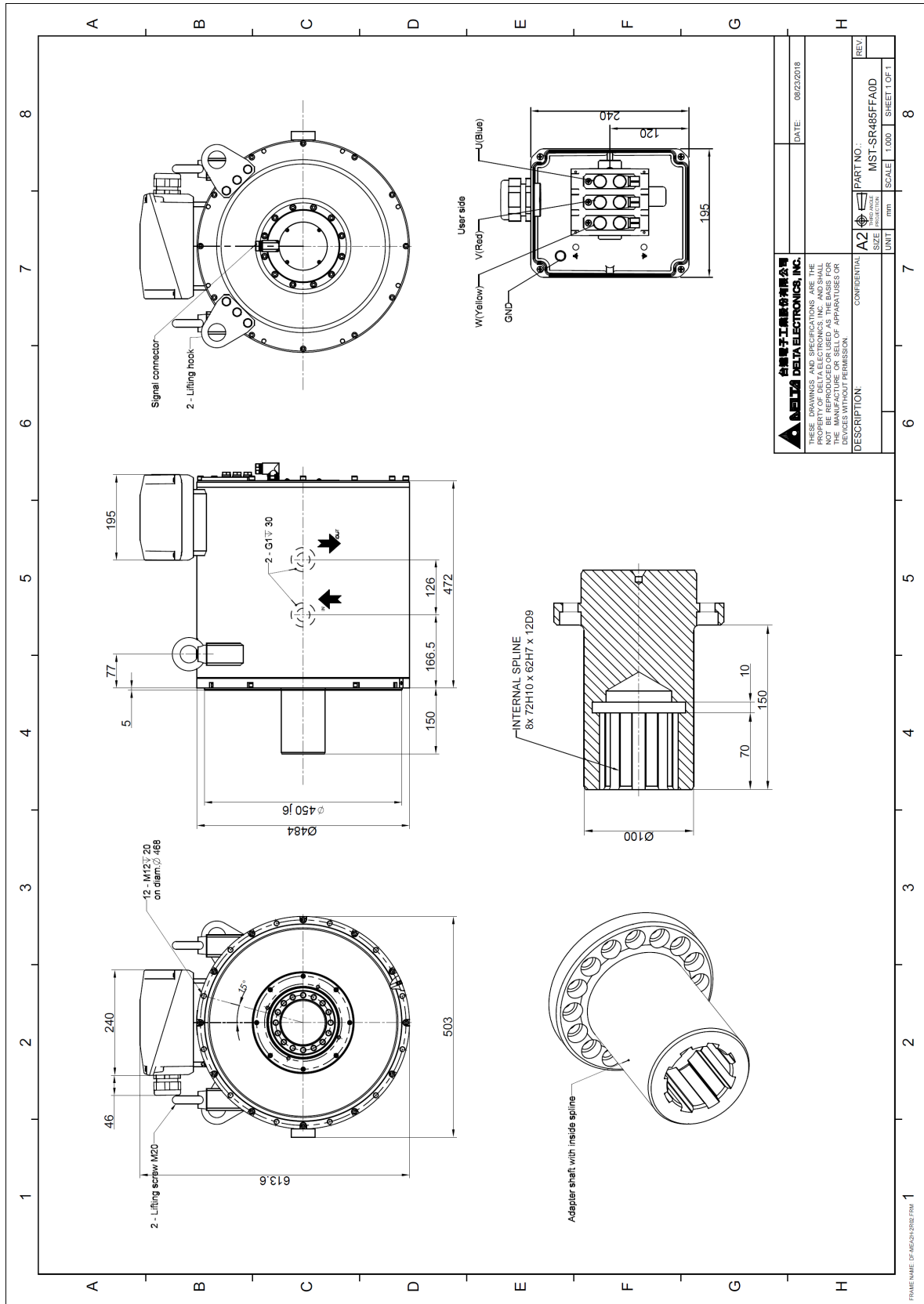


MST-SR485FEA0D



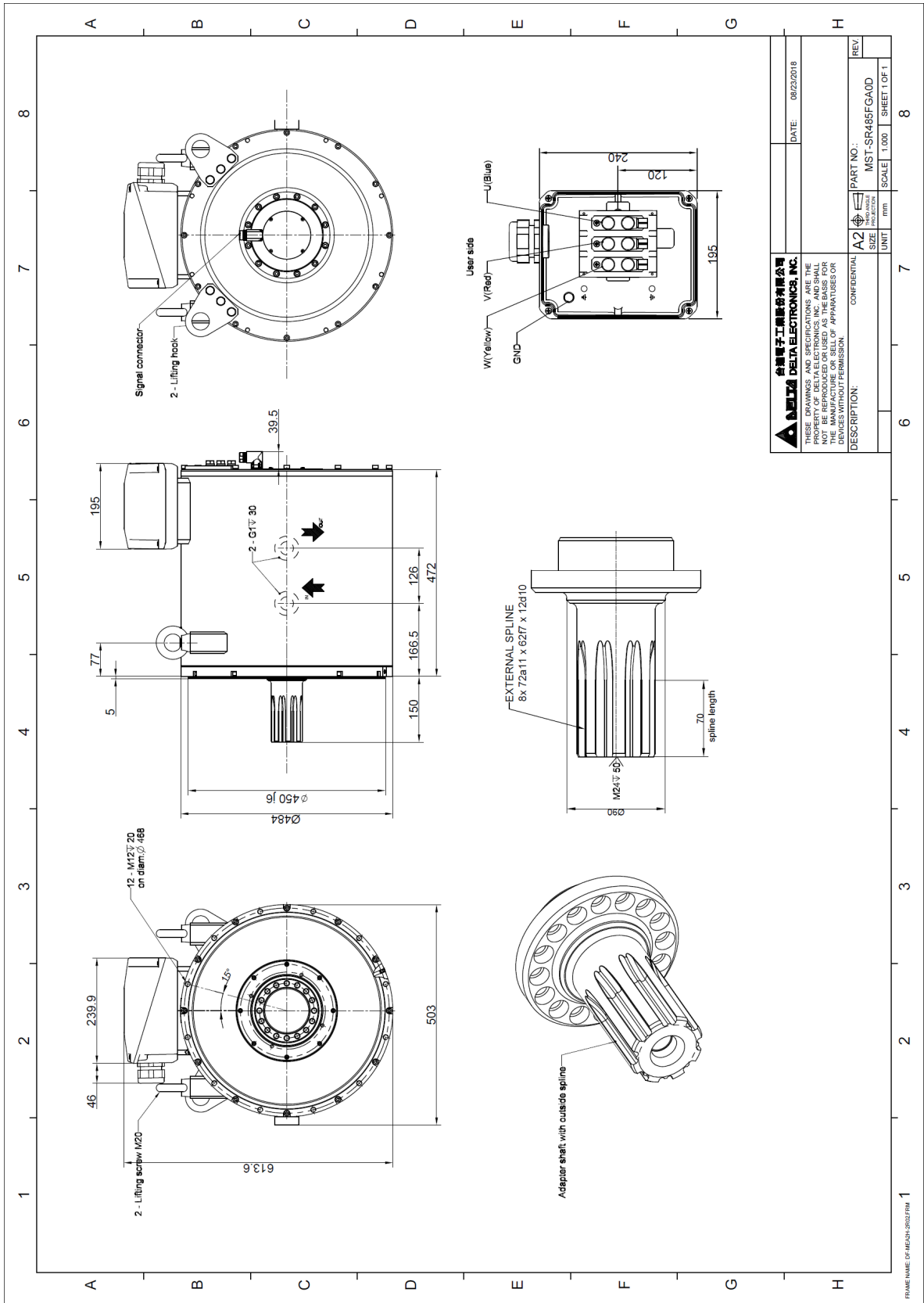
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UNIT: mm	SCALE: 1:100	SHEET 1 OF 1

MST-SR485FFA0D



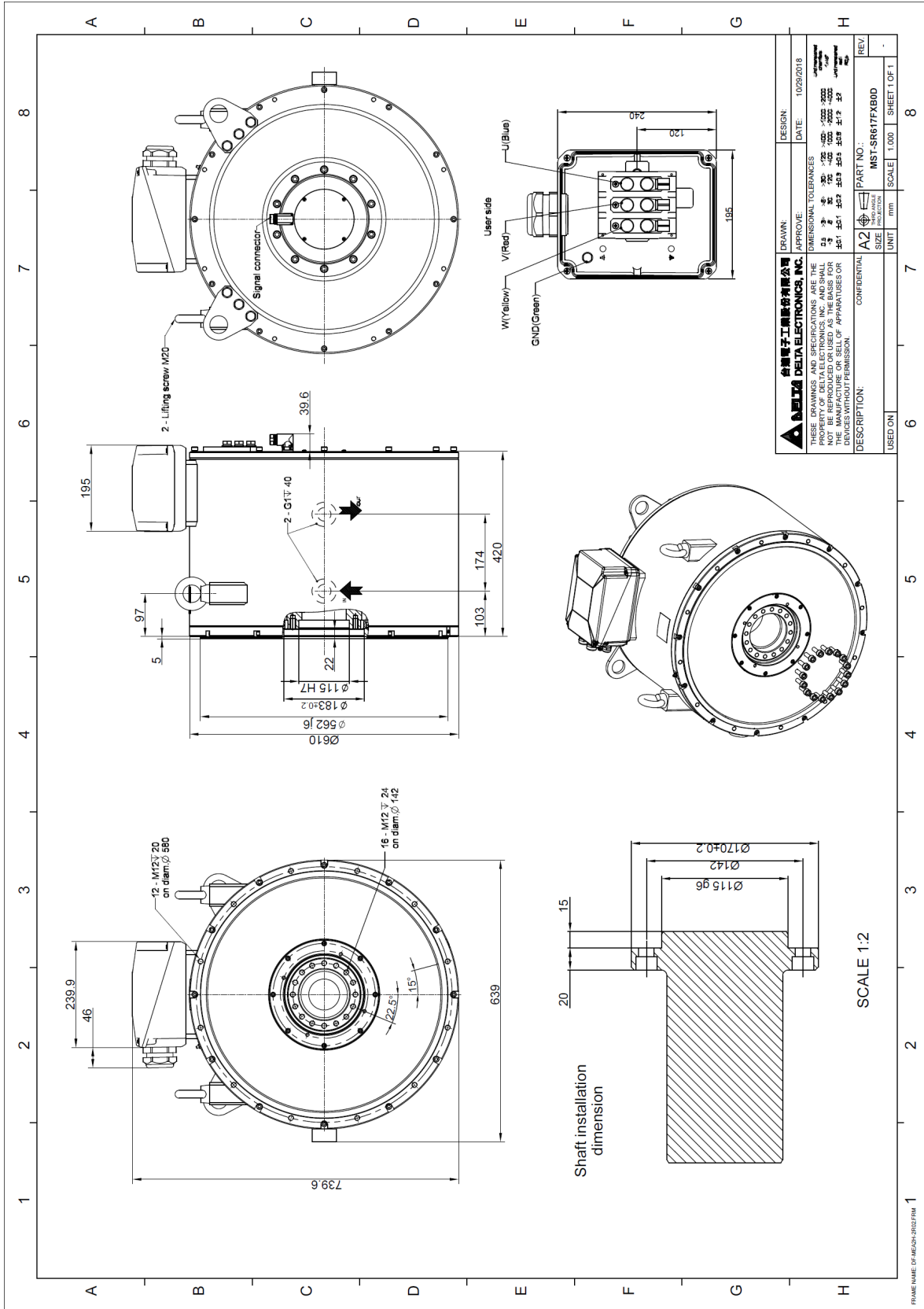
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DESCRIPTION:	CONFIDENTIAL	
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UNIT: mm	SCALE: 1:000	SHEET 1 OF 1

MST-SR485FGA0D

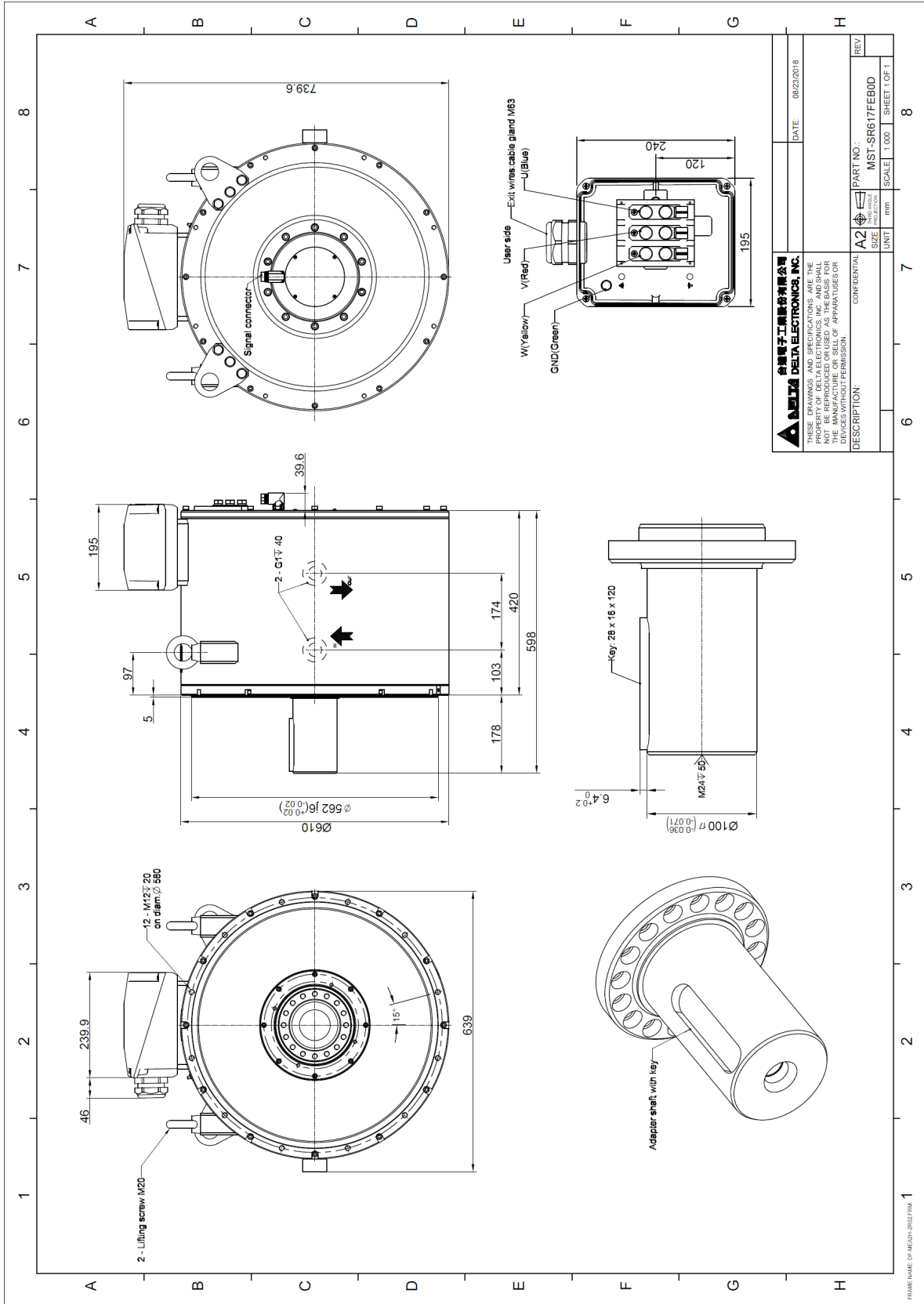


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DESCRIPTION:	PART NO.: MST-SR485FGA0D	REV:
SIZE: A2	UNIT: mm	SCALE: 1:80
SHEET: 1	TOTAL SHEETS: 8	SHEET 1 OF 1

MST-SR617FXB0D

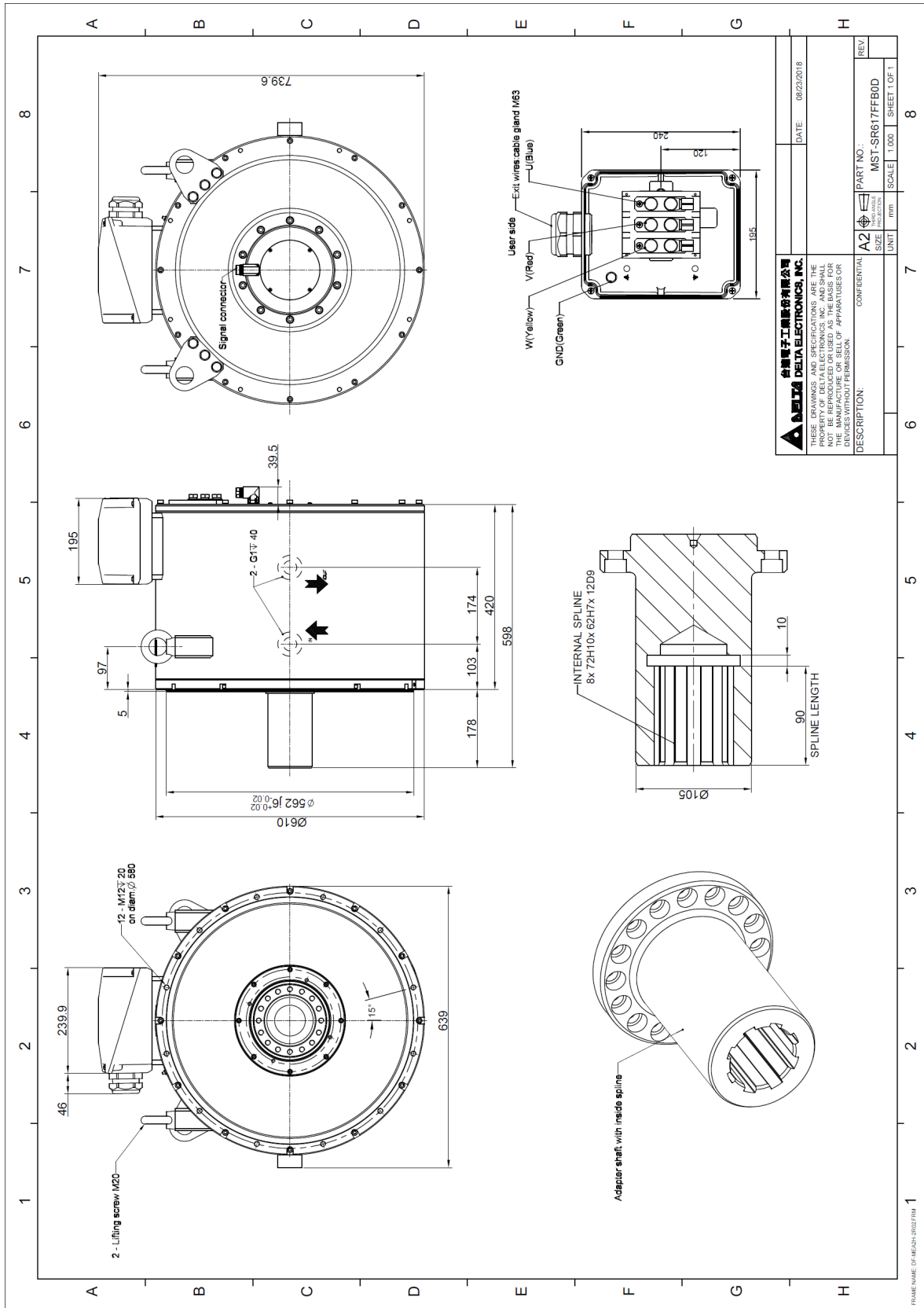


MST-SR617FEB0D



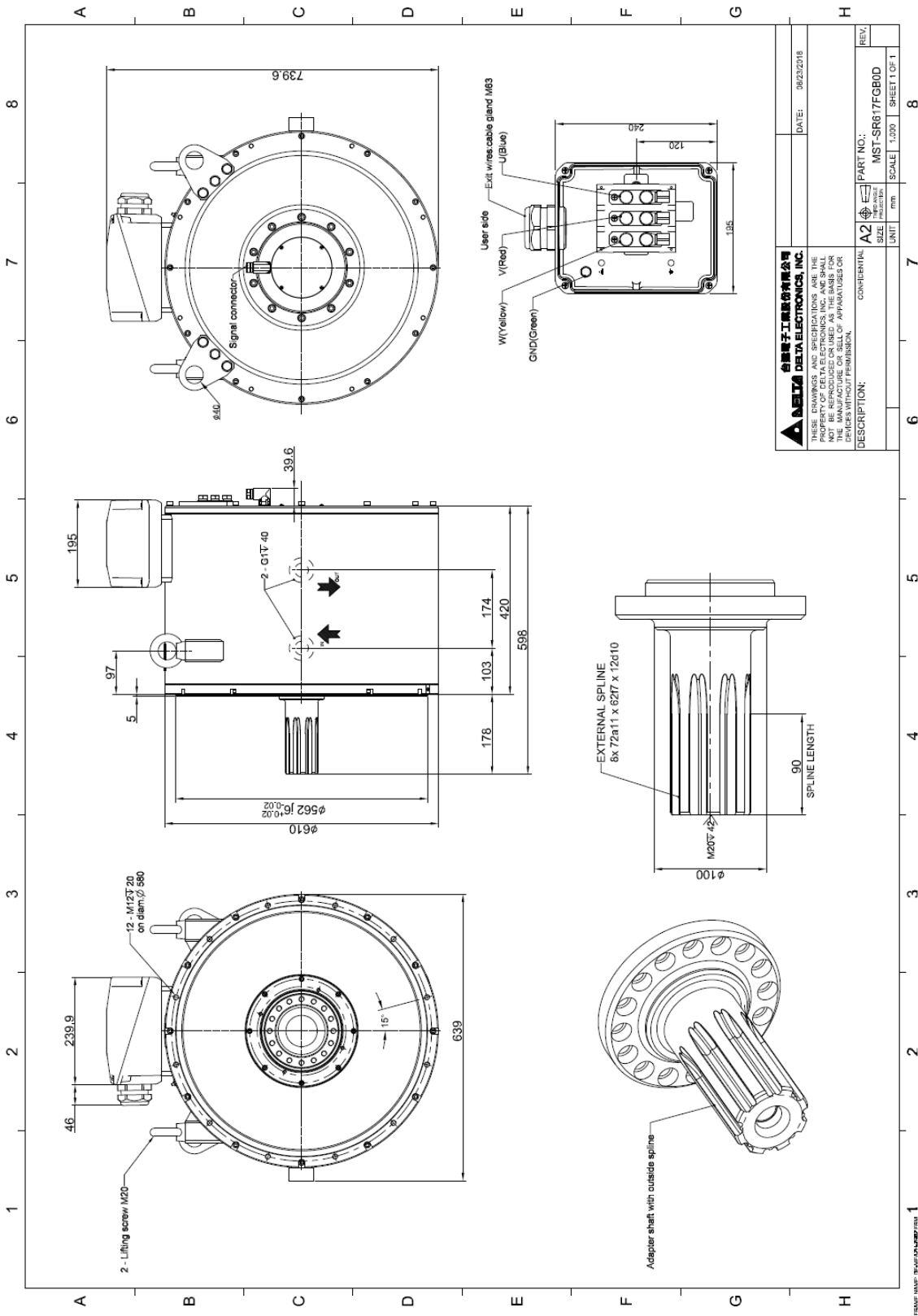
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MST-SR617FFB0D



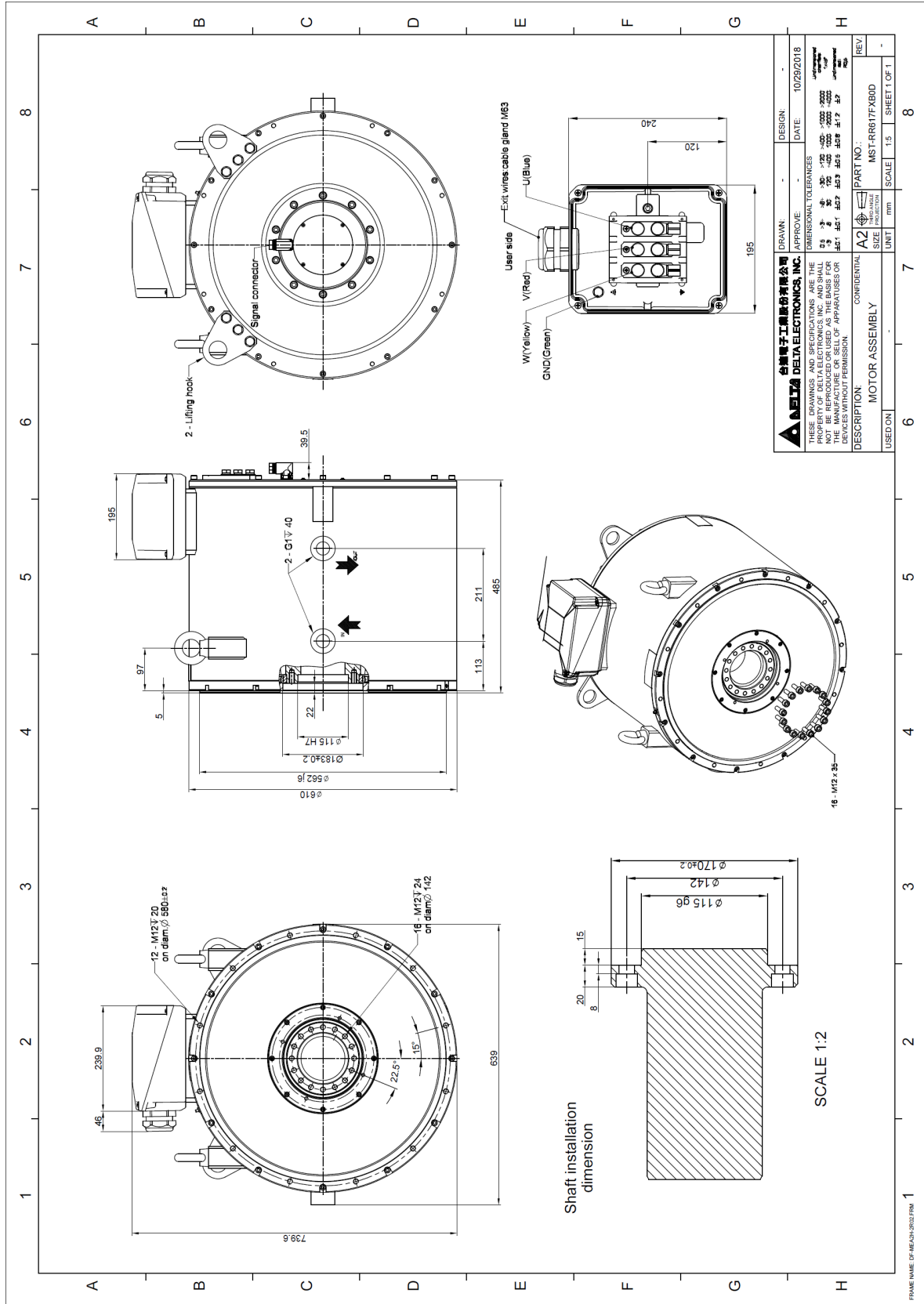
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DESCRIPTION:	CONFIDENTIAL	
SIZE: A2	PART NO.: MST-SR617FFB0D	REV:
UNIT: mm	SCALE: 1:000	SHEET 1 OF 1

MST-SR617FGB0D

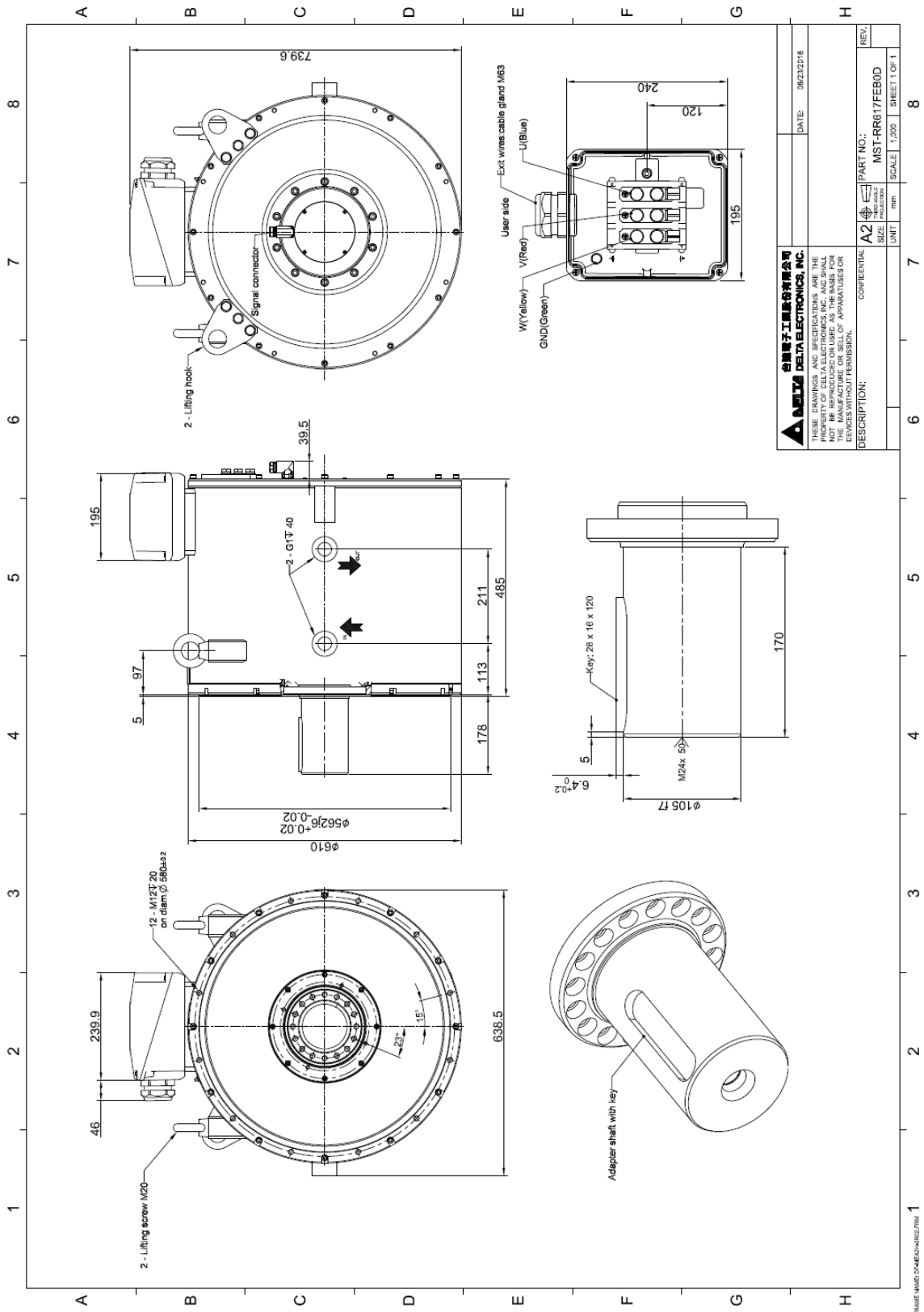


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DESCRIPTION: CONFIRMING	PART NO.: MST-SR617FGB0D	REV.: SHEET 1 OF 1
SIZE: A2 UNIT: mm	SCALE: 1:200	SHEET 1 OF 1

MST-RR617FXB0D

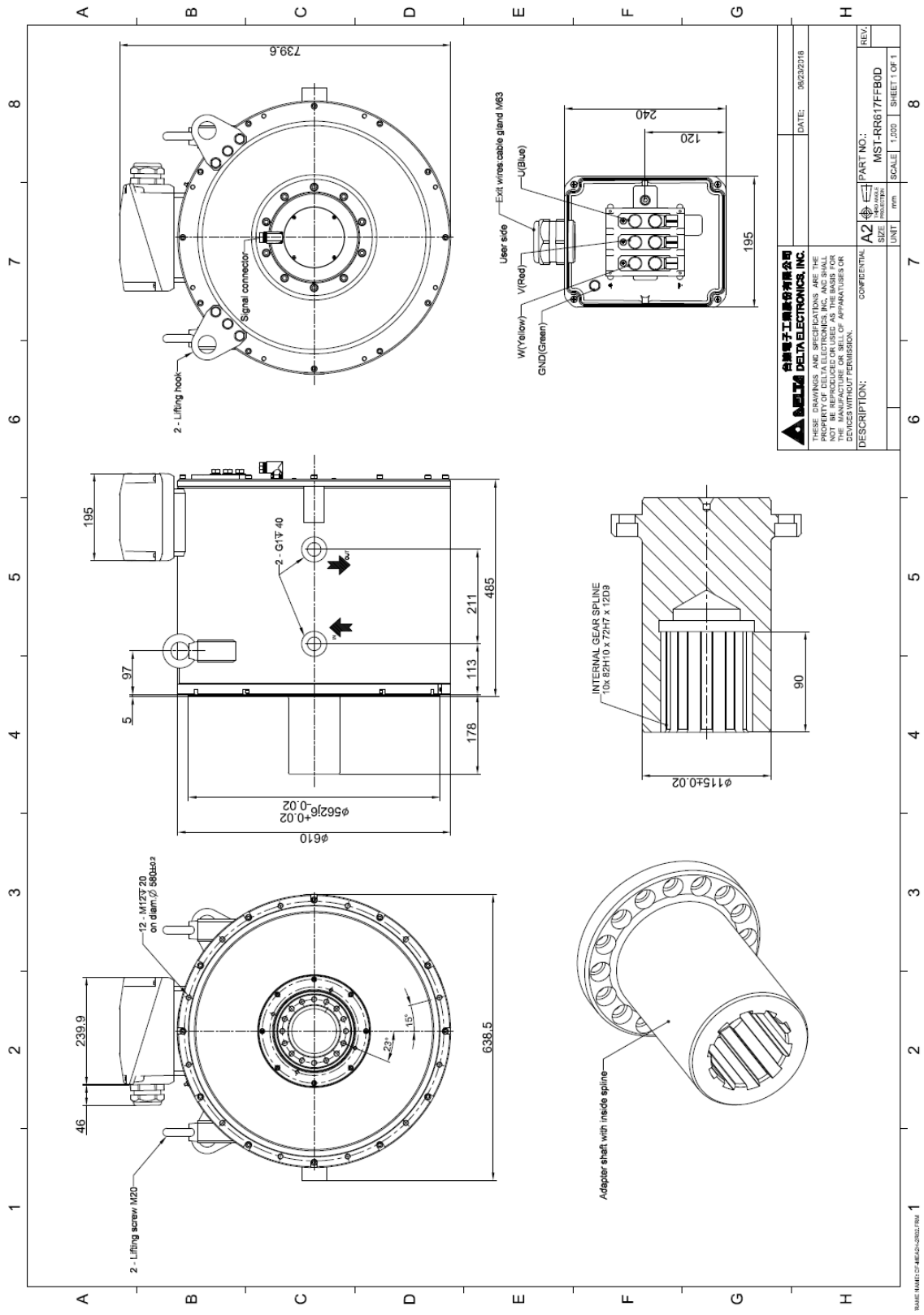


MST-RR617FEB0D

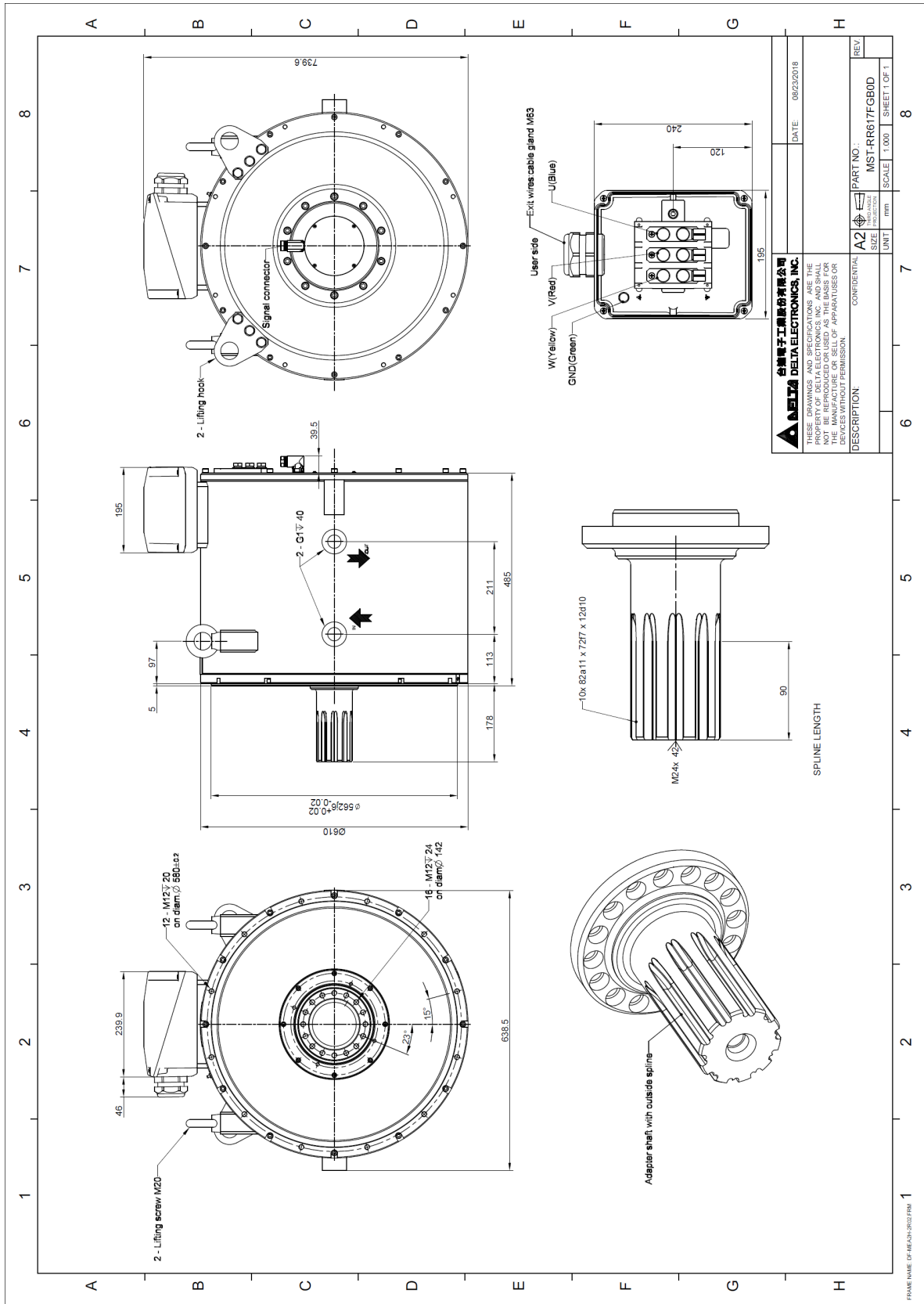


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DESCRIPTION: CONFIDENTIAL		PART NO.: MST-RR617FEB0D	
A2	SIZE	SCALE	SHEET 1 OF 1
mm	UNIT	1:000	8

MST-RR617FFB0D



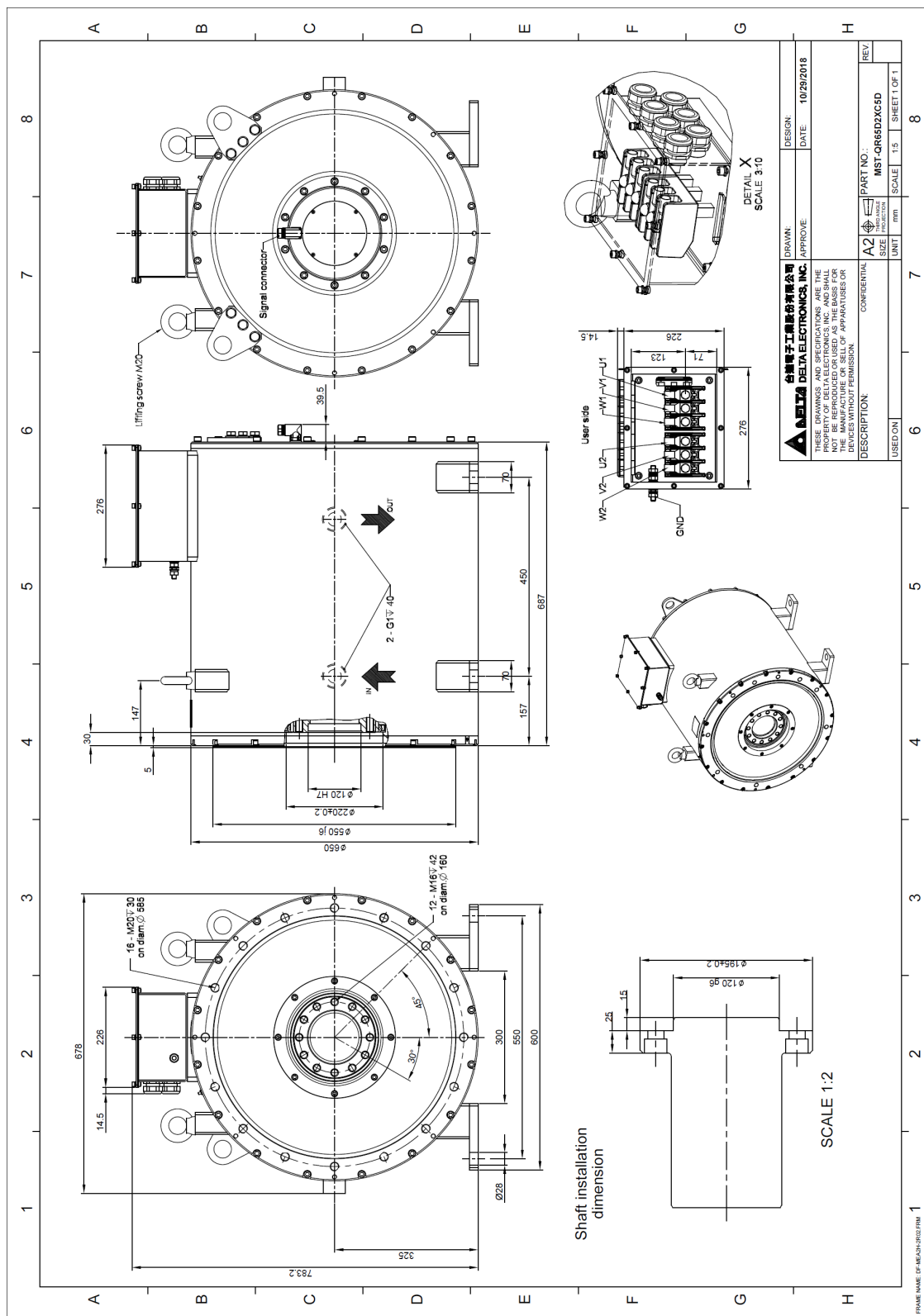
MST-RR617FGB0D



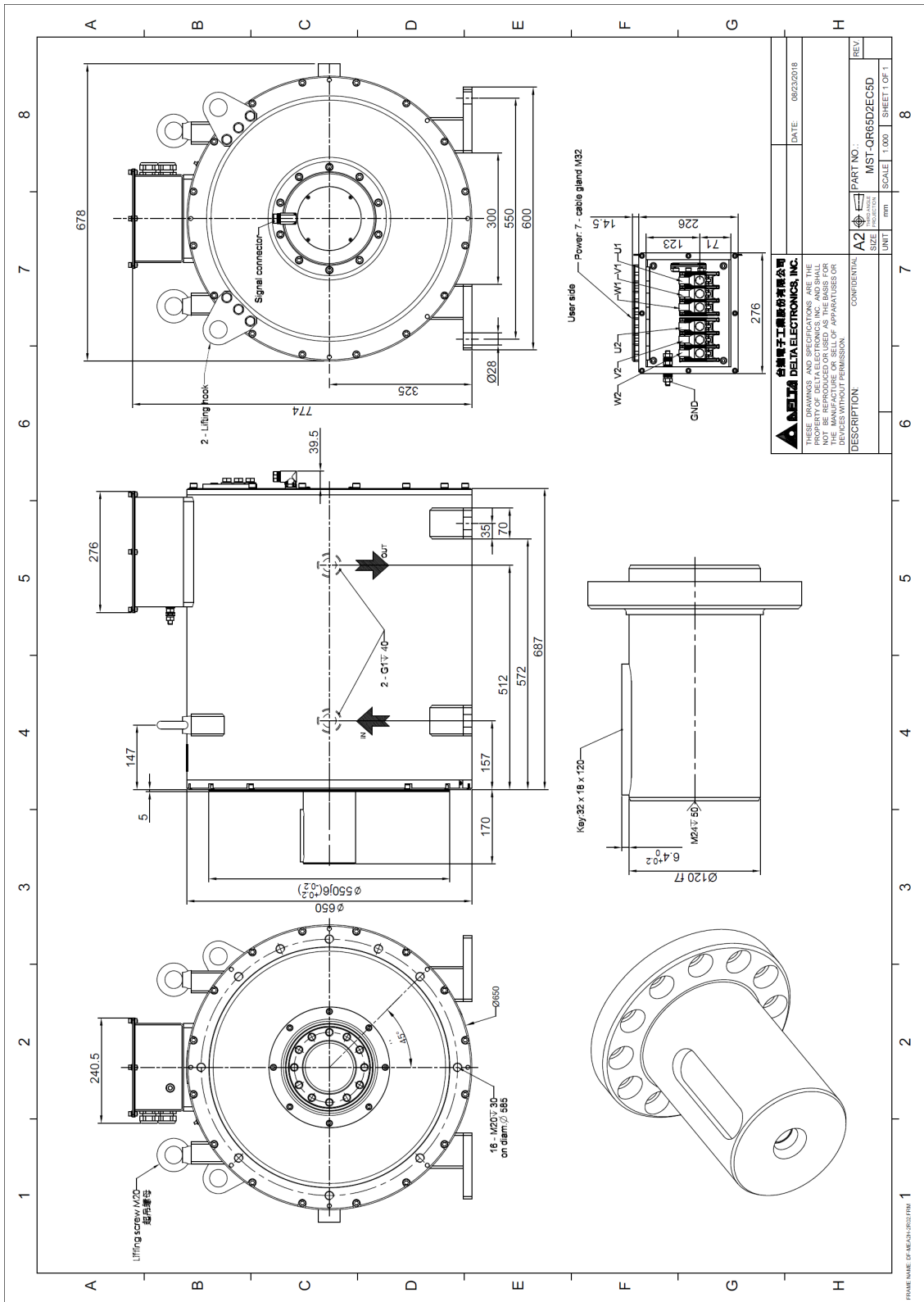
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DESCRIPTION		
SIZE: A2	PART NO.: MST-RR617FGB0D	REV:
UNIT: mm	SCALE: 1:100	SHEET 1 OF 1

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MST-QR65D2XC5D, MST- RR65G0XC5D

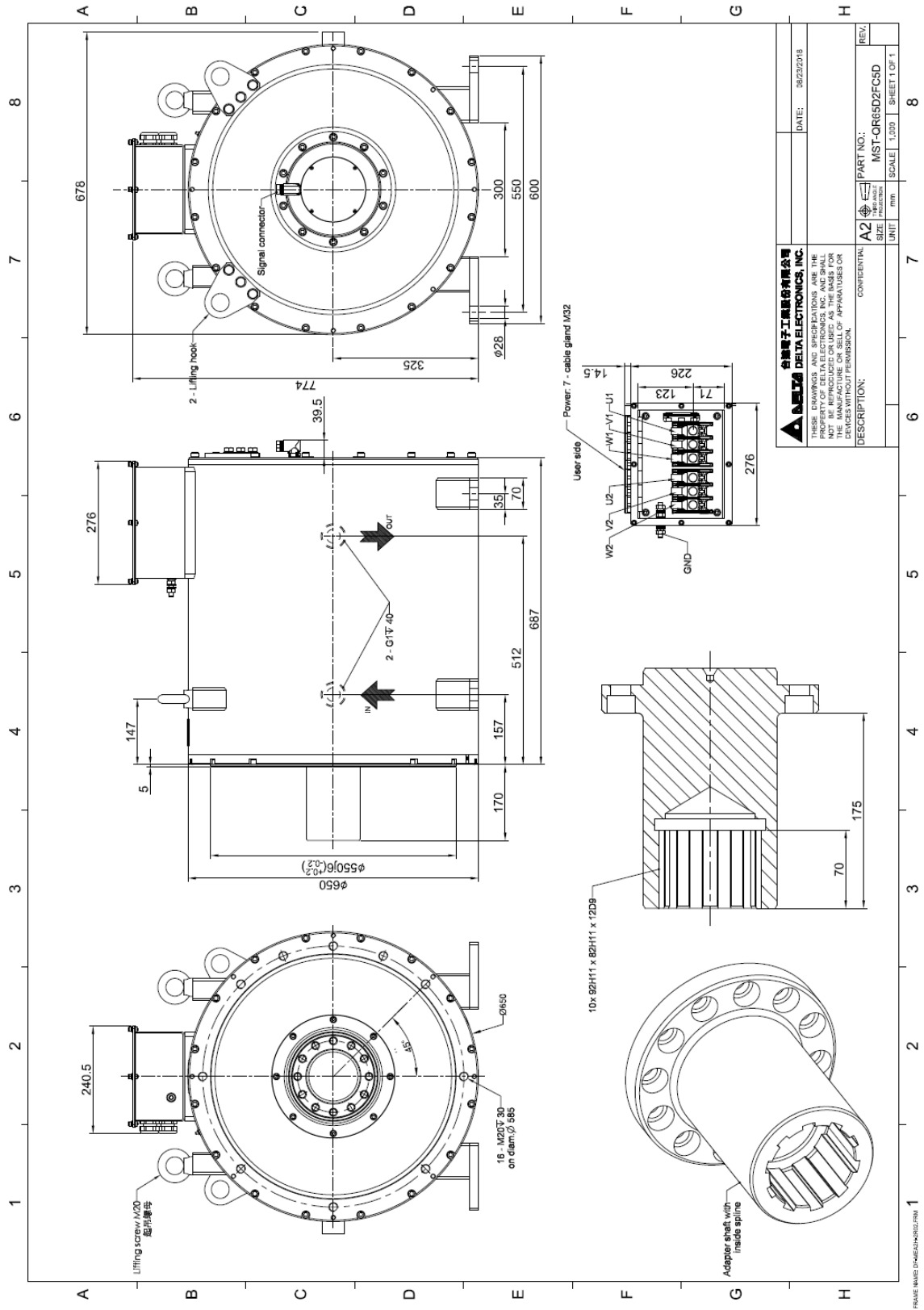


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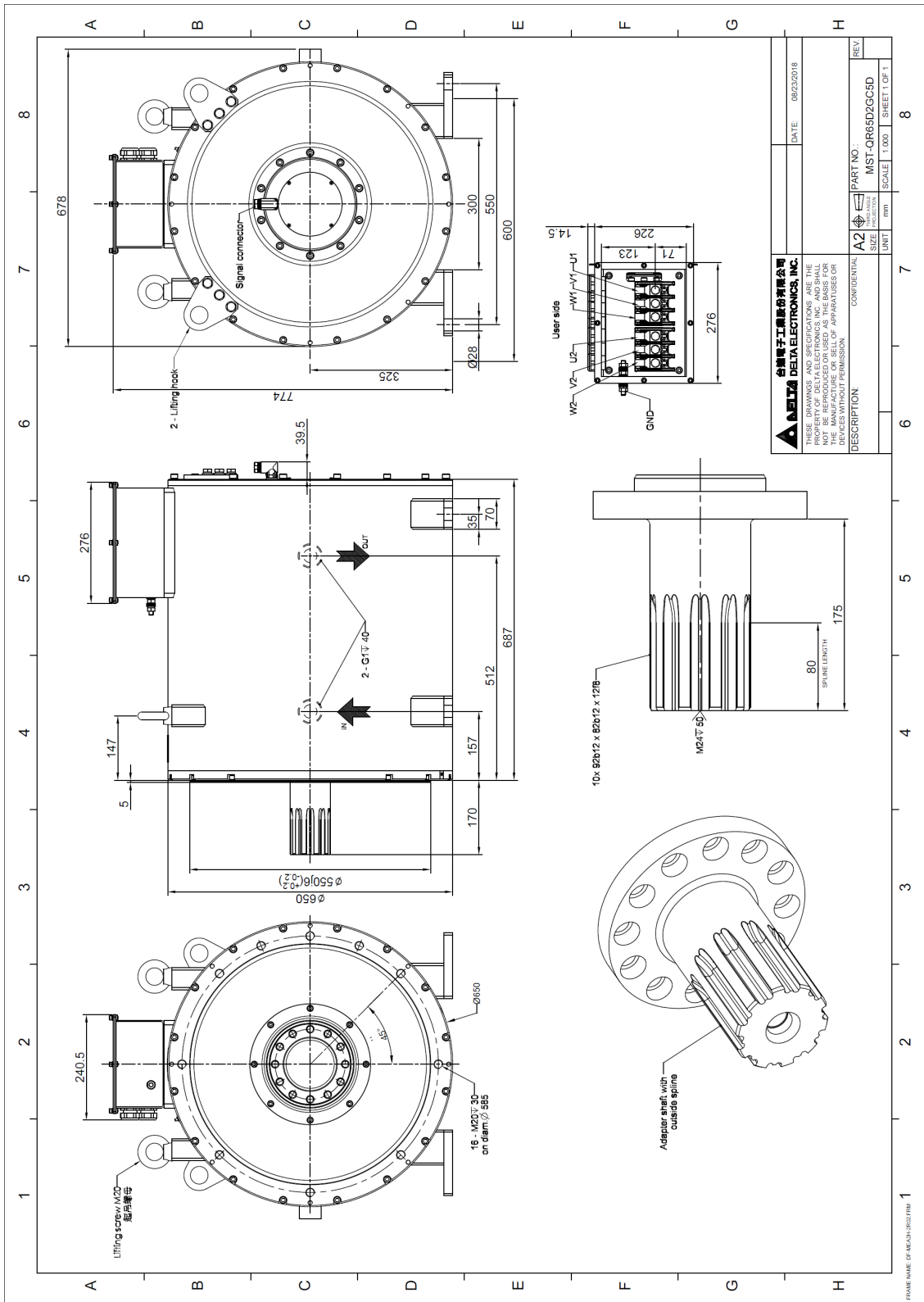
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DESCRIPTION:	CONFIDENTIAL	REV:
SIZE: A2	UNIT: mm	SCALE: 1:000

MST-QR65D2FC5D, MST-RR65G0FC5D



DATE: 8/22/2018	
PART NO.: MST-QR65D2FC5D	
SCALE: 1:300	SHEET 1 OF 1
REV.:	
SIZE: A2	UNIT: mm
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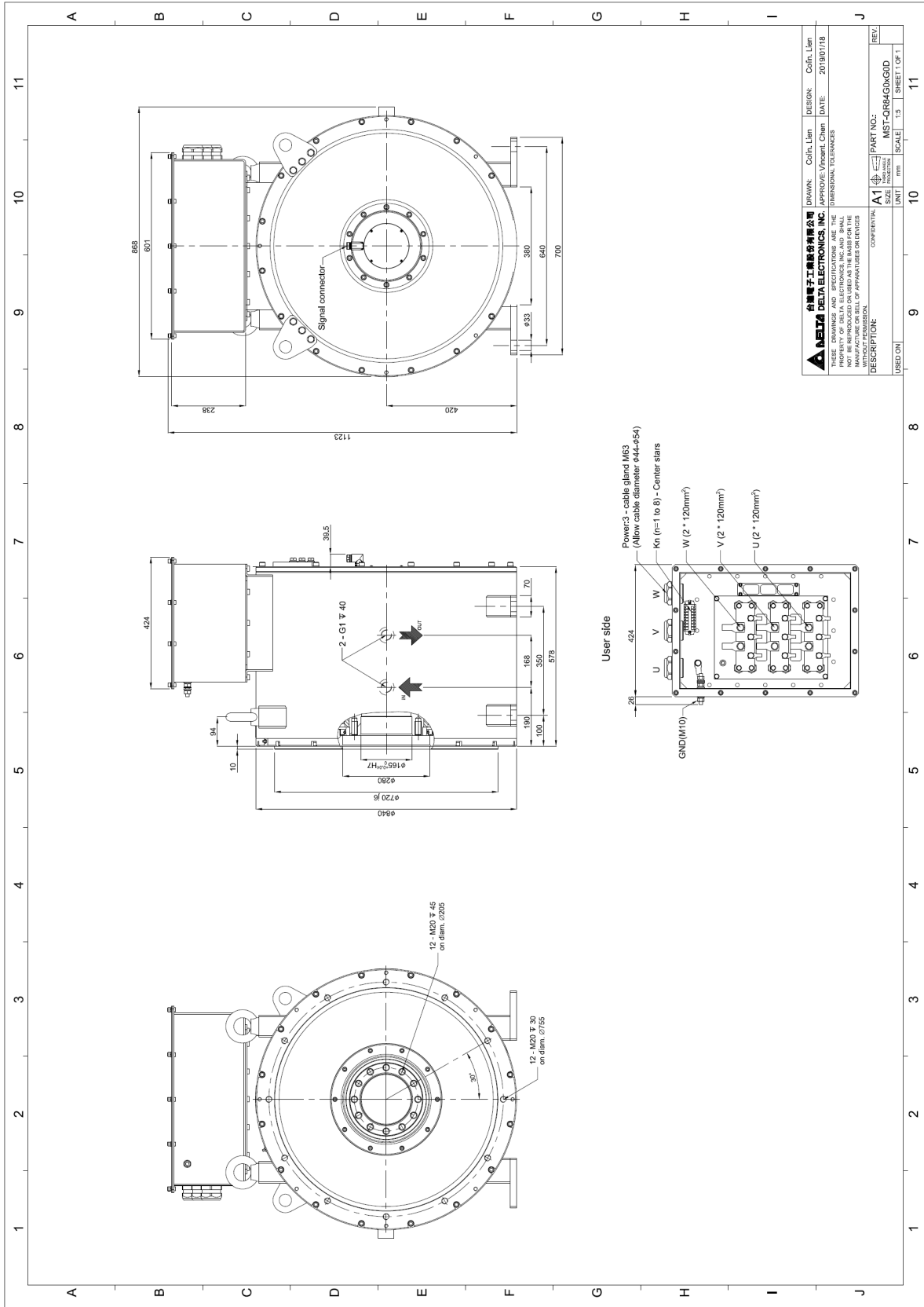
MST-QR65D2GC5D, MST-RR65G0GC5D



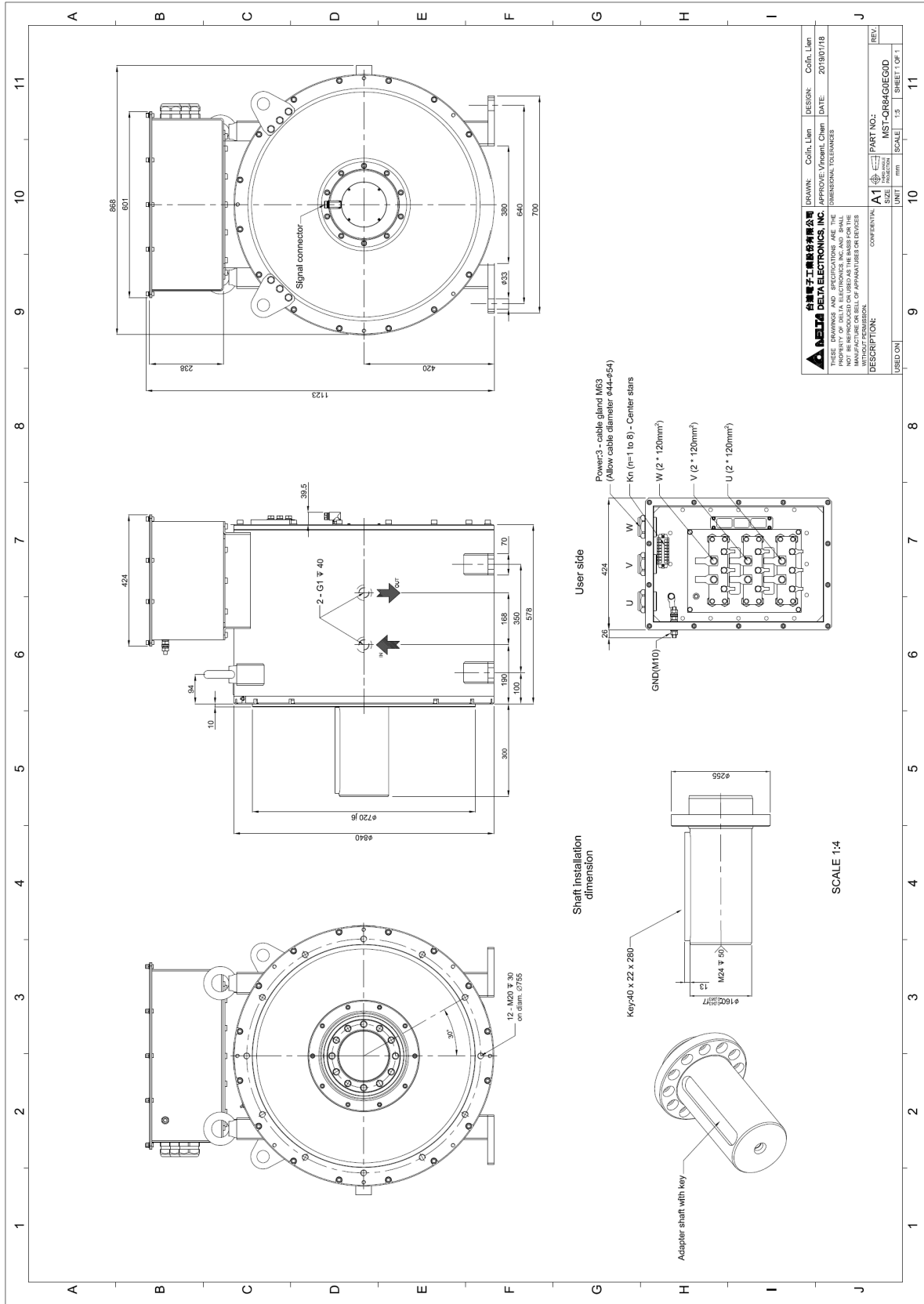
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DESCRIPTION: CONFIDENTIAL	PART NO.: MST-QR65D2GC5D	REV:
SIZE: A2	UNIT: mm	SCALE: 1:000
SHEET 1 OF 1	SHEET 1 OF 1	8

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MST-QR84G0XG0D

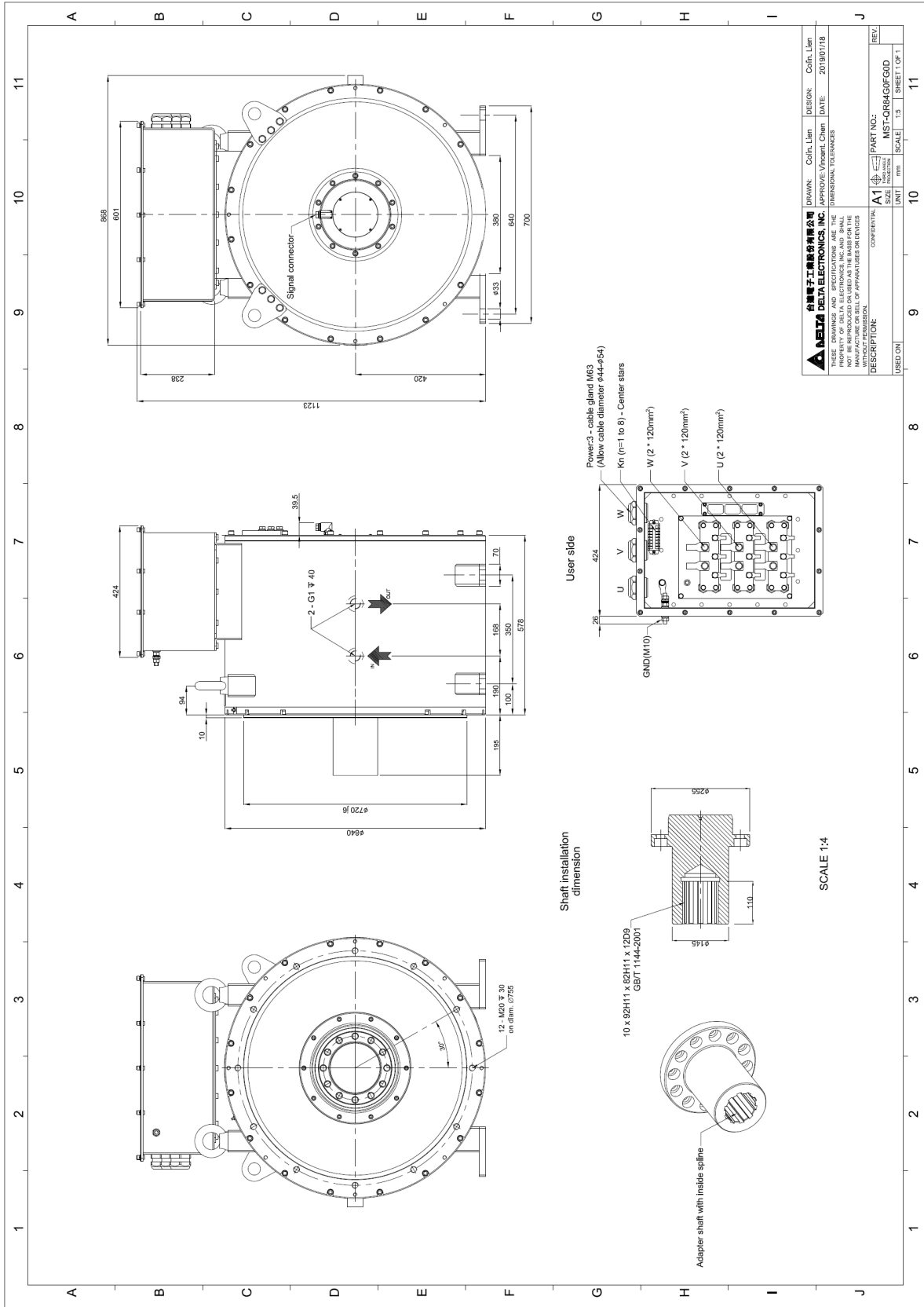


MST-QR84G0EG0D



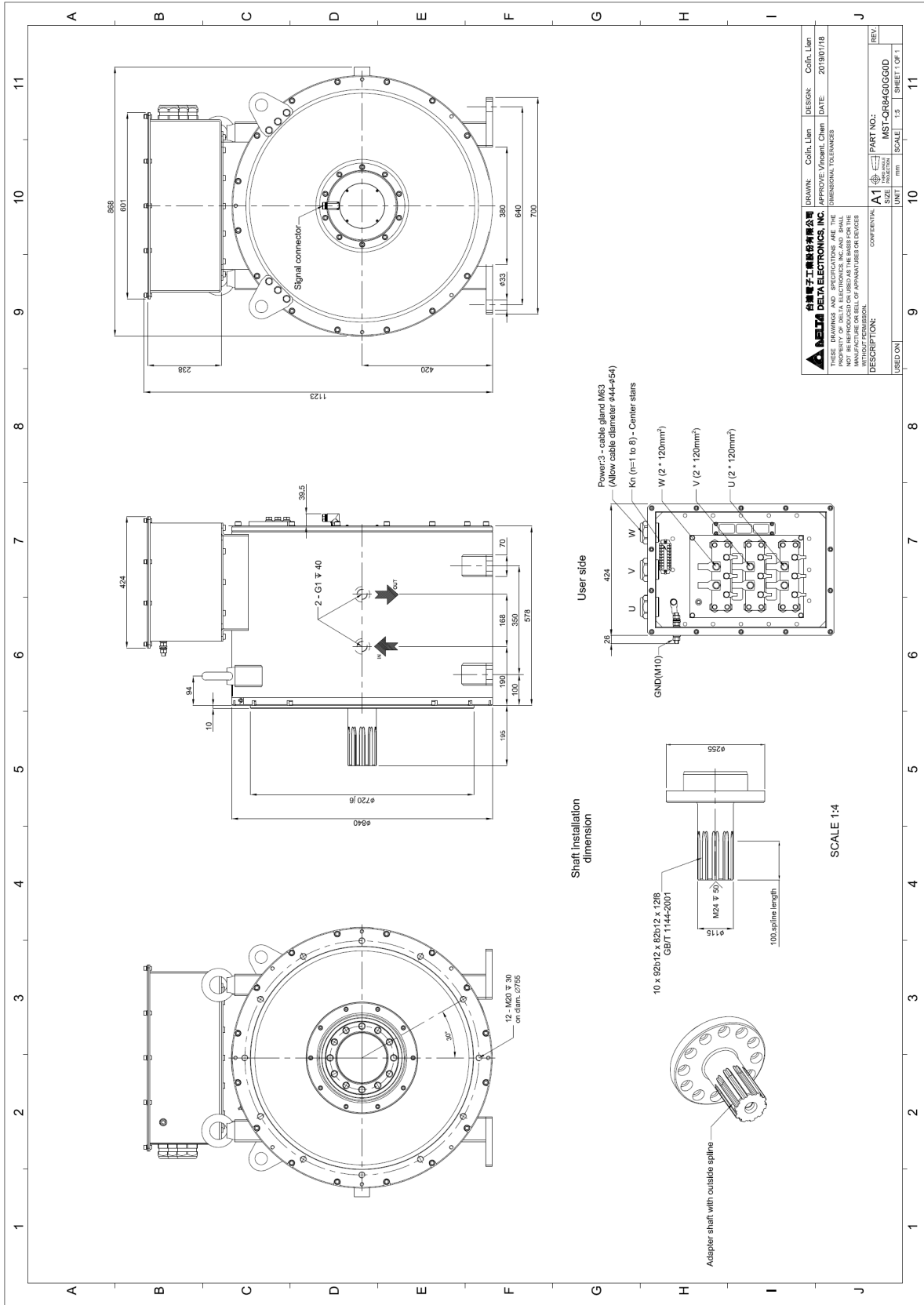
DELTA 台達電子工業股份有限公司		DESIGN: Colin, Lien	DATE: 2019/07/18
DELTA ELECTRONICS, INC.		APPROVE: Vincent, Chen	
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DESCRIPTION:		PART NO.: MST-QR84G0EG0D	REV: 1
UNIT: mm	SCALE: 1:5	SHEET 1 OF 1	

MST-QR84G0FG0D

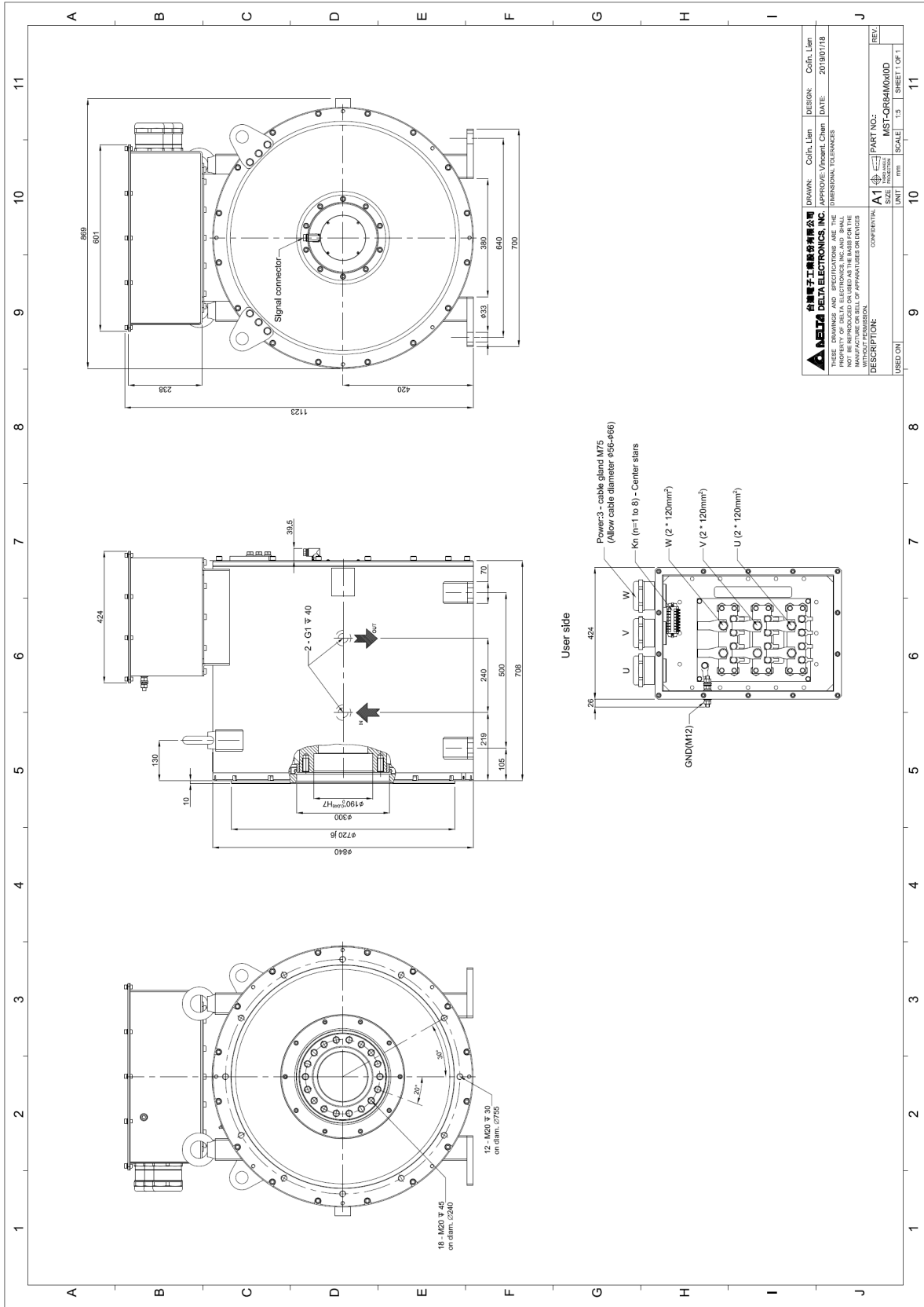


台達電子工業股份有限公司 DELTA ELECTRONICS, INC.	台達電子工業股份有限公司 DELTA ELECTRONICS, INC.	台達電子工業股份有限公司 DELTA ELECTRONICS, INC.	台達電子工業股份有限公司 DELTA ELECTRONICS, INC.
DESIGN: Colin, Lien	DATE: 2019/01/18	APPROVE: Vincent, Chen	DATE: 2019/01/18
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DESCRIPTION: CONFIDENTIAL			
UNIT: mm	SCALE: 1:5	PART NO.: MST-QR84G0FG0D	REV.:
SHEET 1 OF 1			

MST-QR84G0GG0D

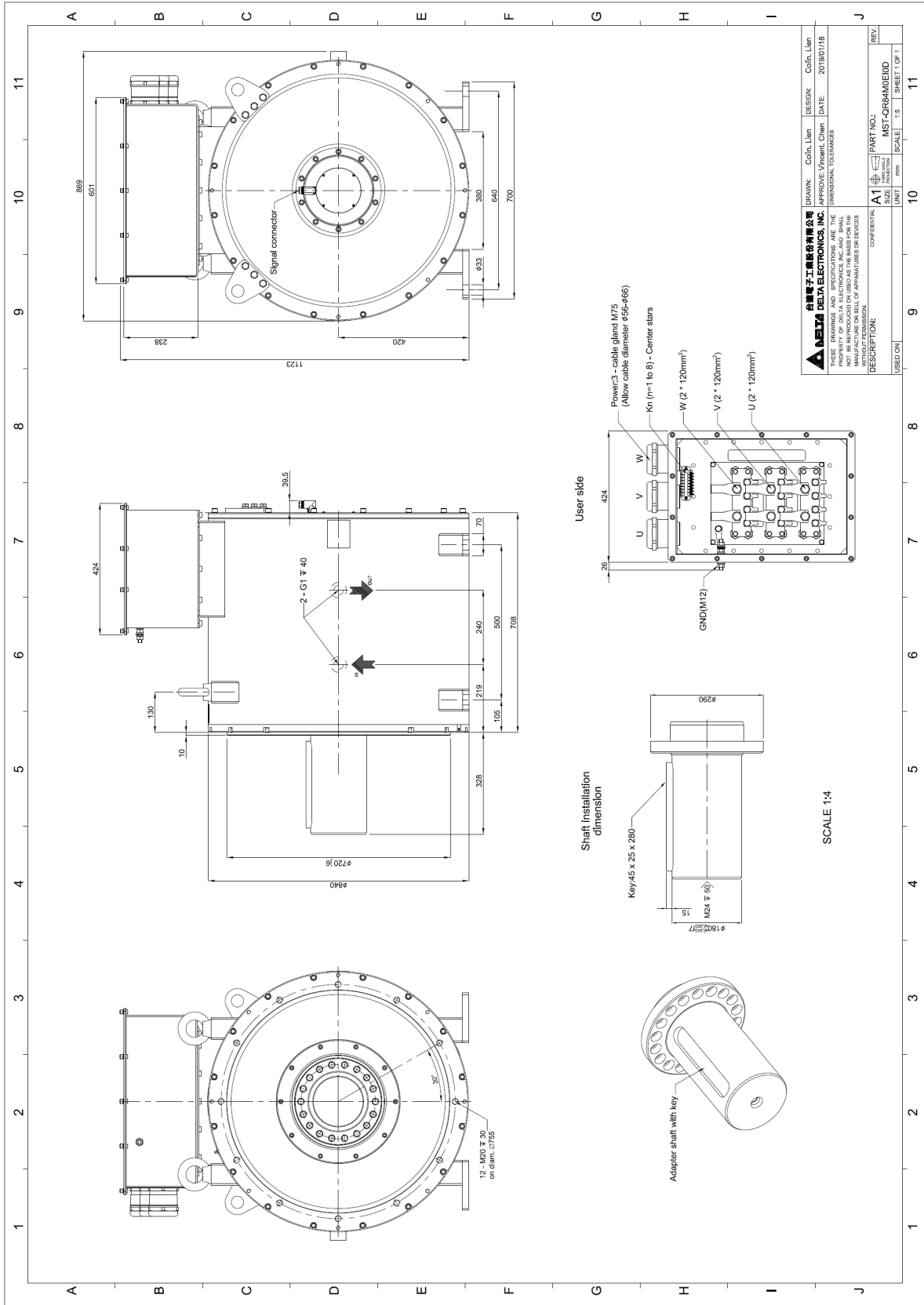


MST-QR84M0X10D



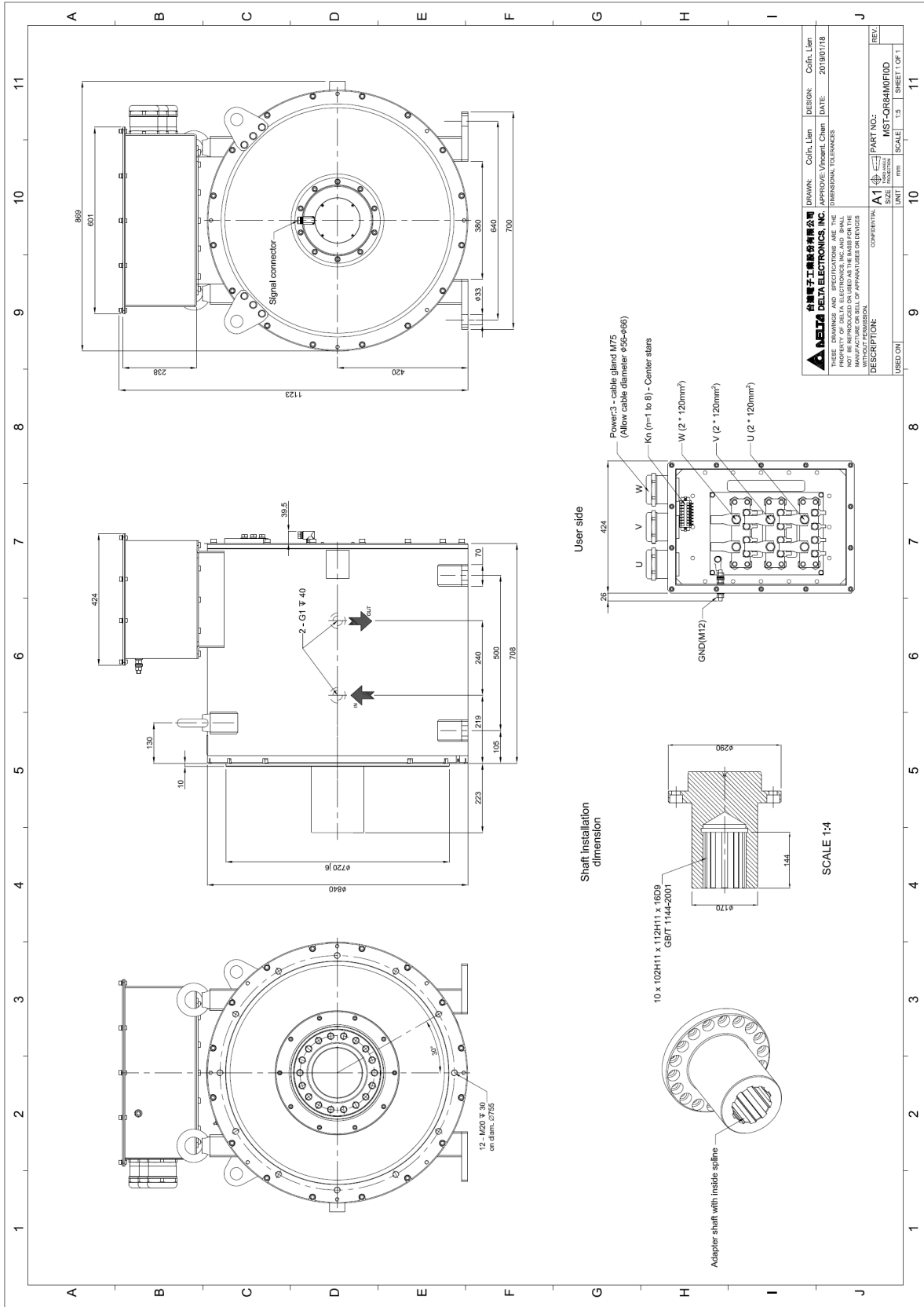
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	PART NO.: MST-QR84M0X10D SCALE: 1:5 SHEET 1 OF 1	

MST-QR84M0E10D



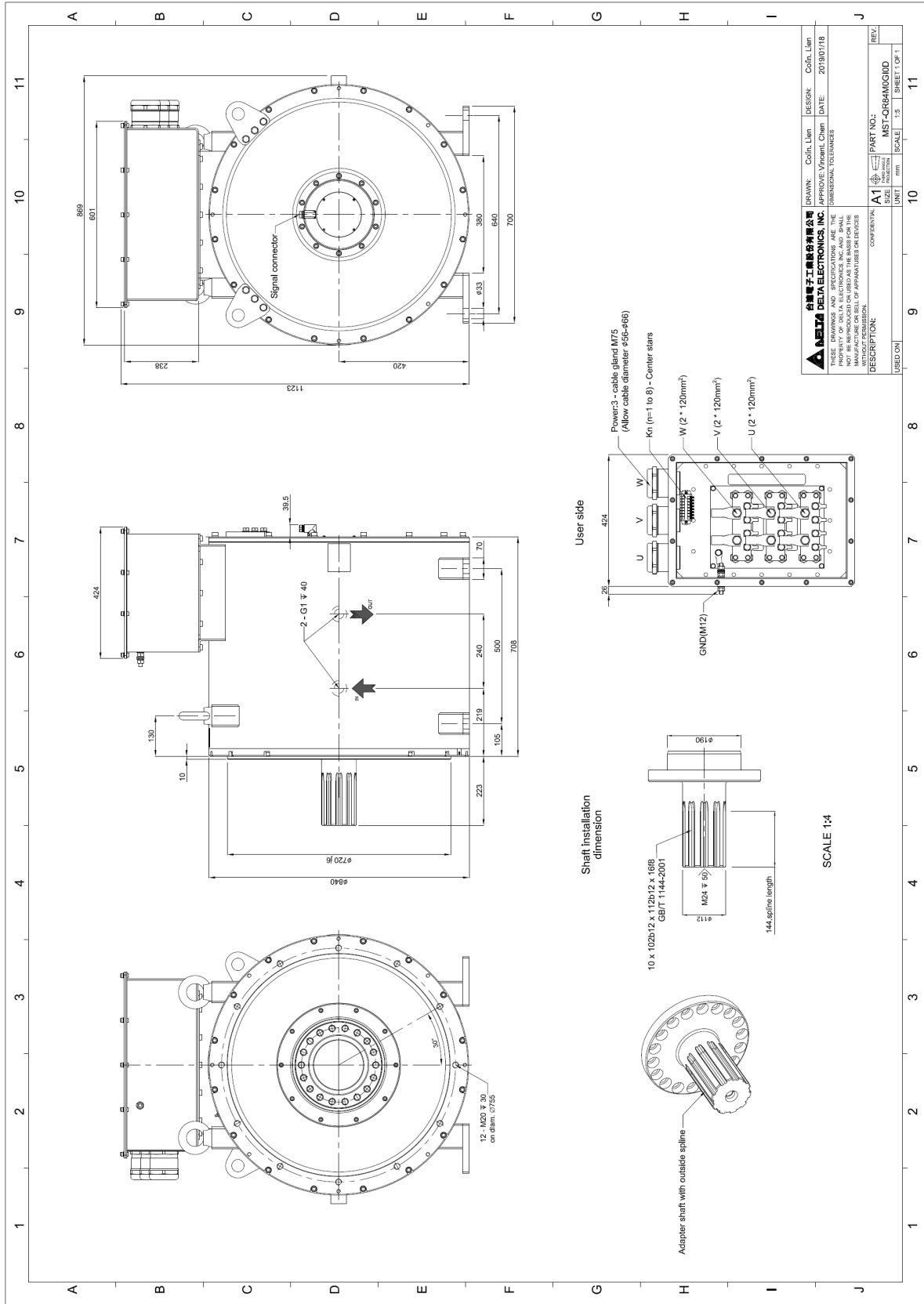
** Delta reserves the right to change product specifications **

MST-QR84M0FI0D



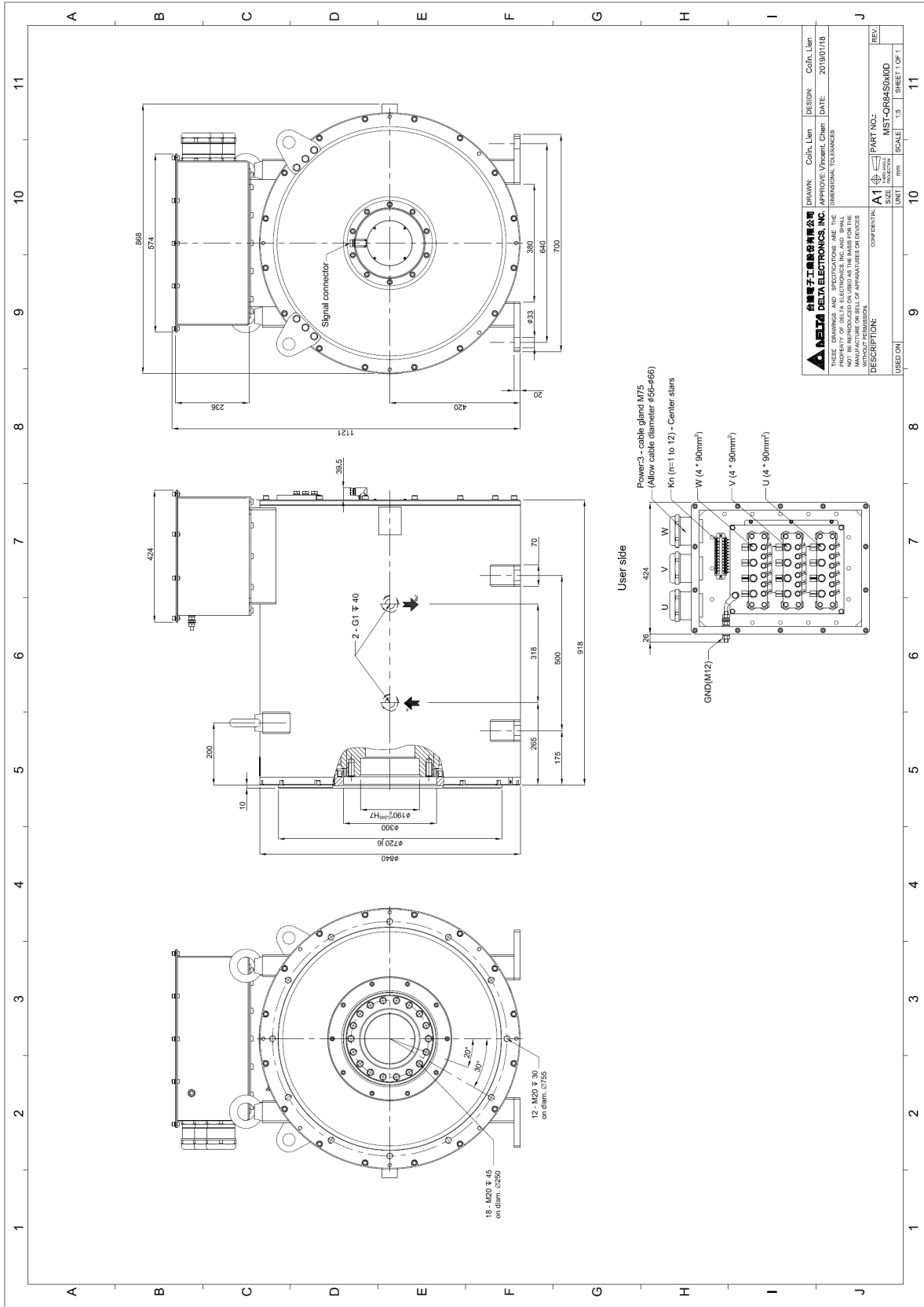
DELTA 台達電子工業股份有限公司		DESIGN: Colin, Lien	DATE: 20180118
DRAWN: Colin, Lien		APPROVE: Vincent, Chen	DATE: 20180118
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DESCRIPTION: CONFIDENTIAL		PART NO: MST-QR84M0FI0D	REV: 1
UNIT: mm	SCALE: 1:5	SHEET 1 OF 1	

MST-QR84M0GI0D



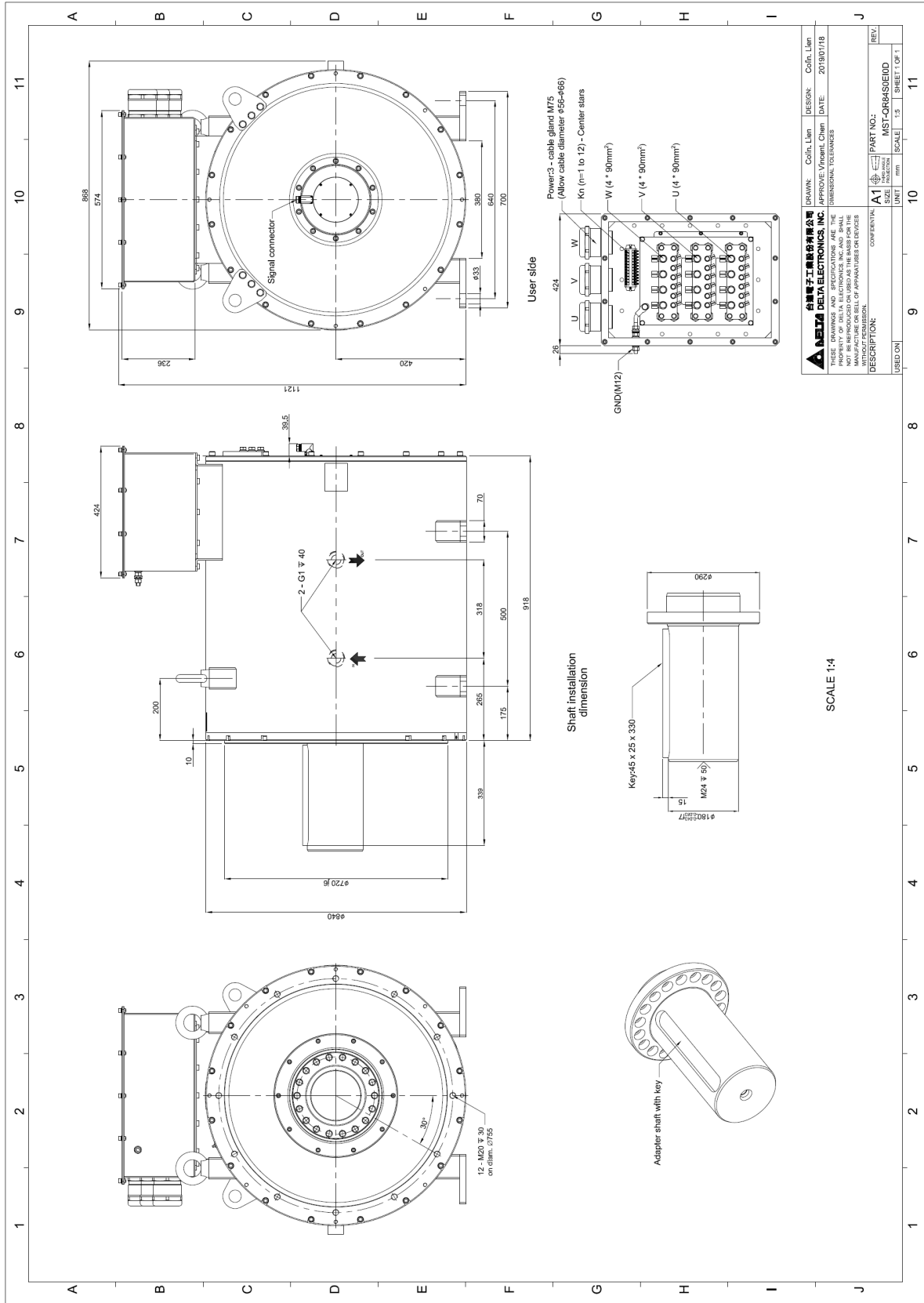
DELTA 台達電子股份有限公司		DESIGN: Colin, Lien
DELTA ELECTRONICS, INC.		APPROVE: Vincent, Chen
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DESCRIPTION: CONFIDENTIAL		PART NO.: MST-QR84M0GI0D
USED ON:	UNIT: mm	SCALE: 1:3
		SHEET 1 OF 1

MST-QR84S0XI0D



台達電子工業股份有限公司		DESIGN: Colin, Lien	DATE: 2015/01/18
DELTA ELECTRONICS, INC.		APPROVE: Vincent, Chen	
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DESCRIPTION: CONVERTER		PART NO.: MST-QR84S0XI0D	REV.:
SIZE: mm	SCALE: 1:3	SHEET: OF 1	

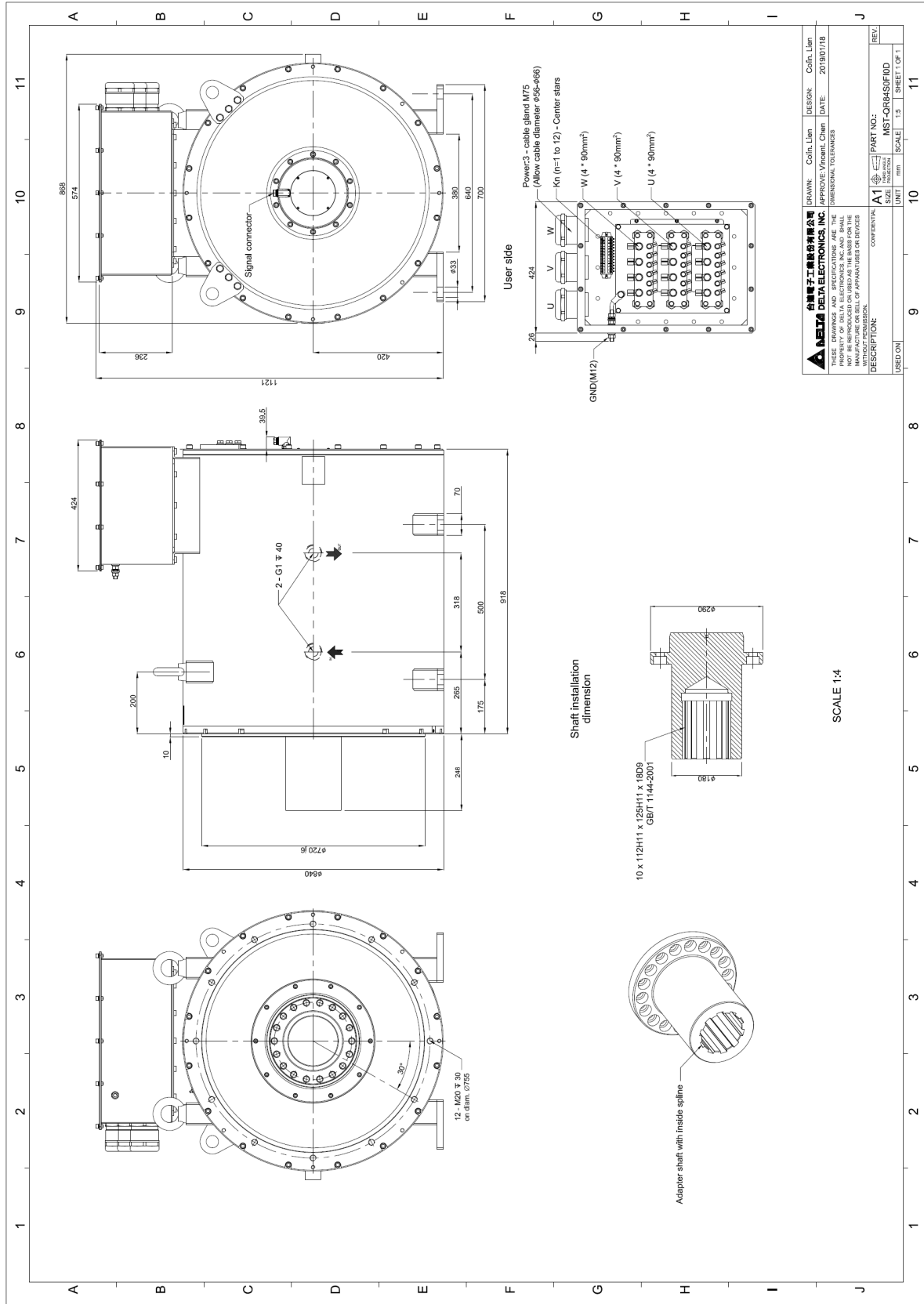
MST-QR84S0E10D



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DESCRIPTION: CONFIDENTIAL	PART NO.: MST-QR84S0E10D	REV:
USED ON:	UNIT: mm SCALE: 1:3 SHEET 1 OF 1	REV:

SCALE 1:4

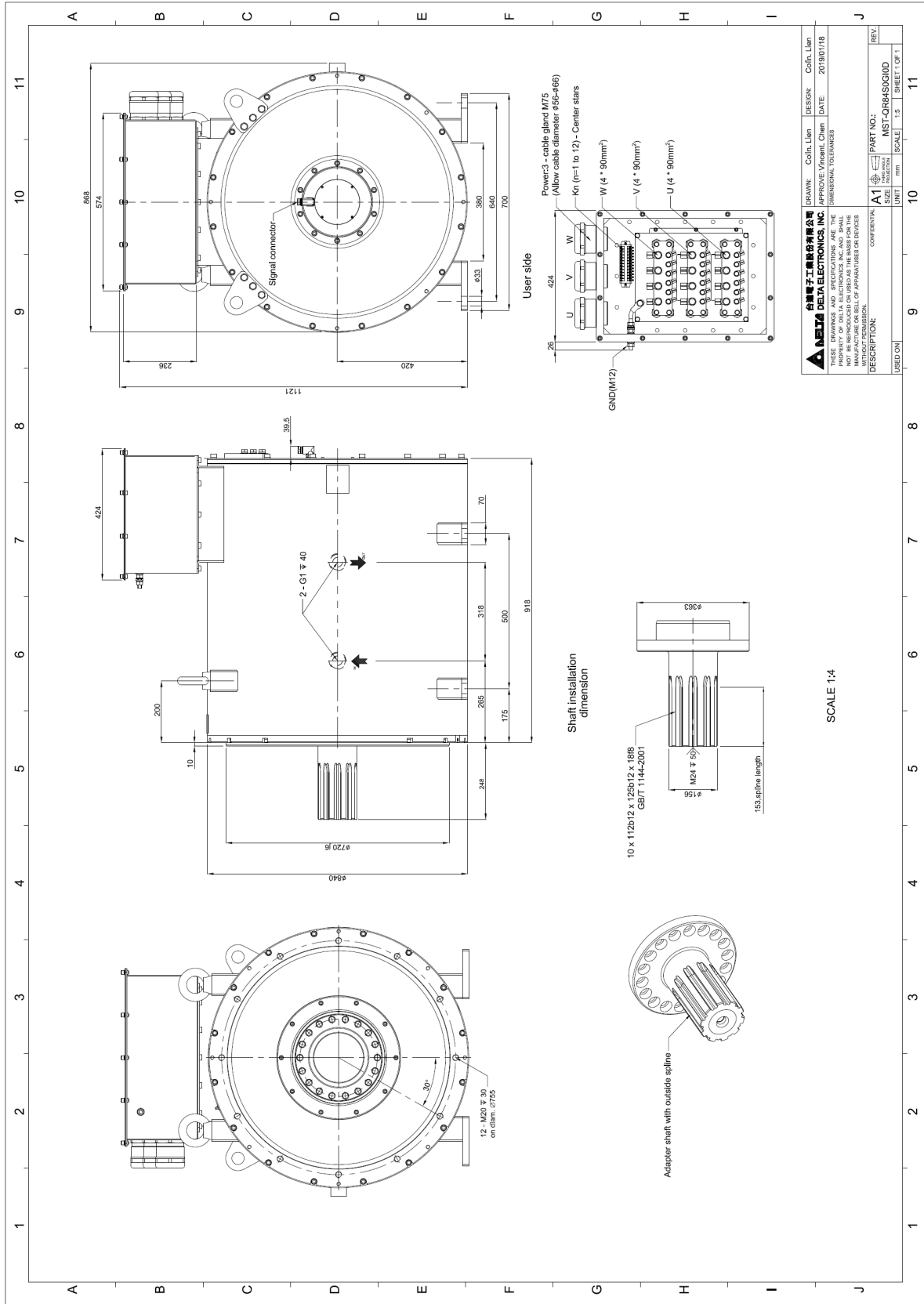
MST-QR84S0F10D



台達電子工業股份有限公司		DRAWN: Colin Lien	DESIGN: Colin Lien
DELTA ELECTRONICS, INC.		APPROVE: Vincent Chen	DATE: 20180118
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DESCRIPTION: CONFIDENTIAL		PART NO: MST-QR84S0F10D	REV: 1
UNIT: mm	SCALE: 1:5	SHEET: 1 OF 1	

SCALE 1:4

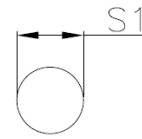
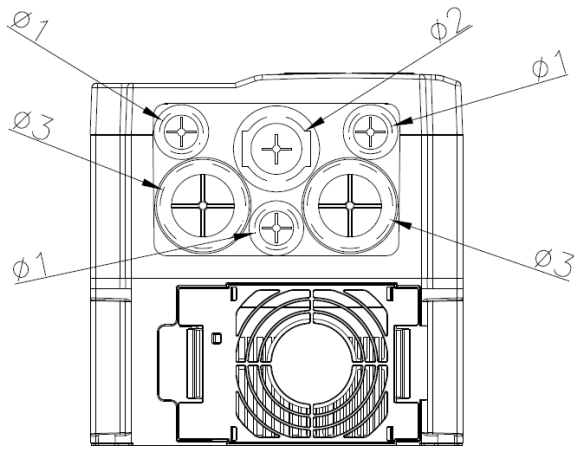
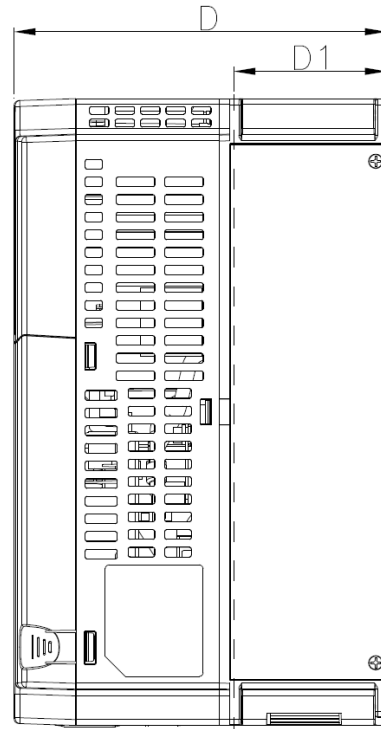
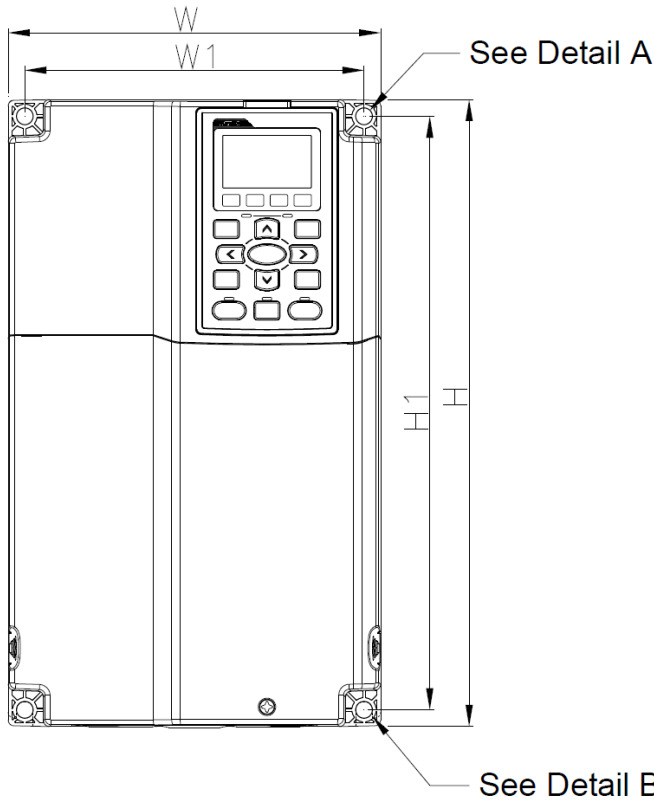
MST-QR84S0GI0D



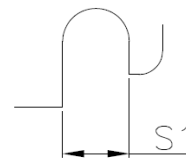
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CONFIDENTIAL USED ON: _____ UNIT: mm SCALE: 1:3 SHEET 1 OF 1	PART NO.: MST-QR84S0GI0D REV: _____

SCALE 1:4

VFD150CH43A-21



Detail A (Mounting Hole)



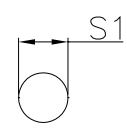
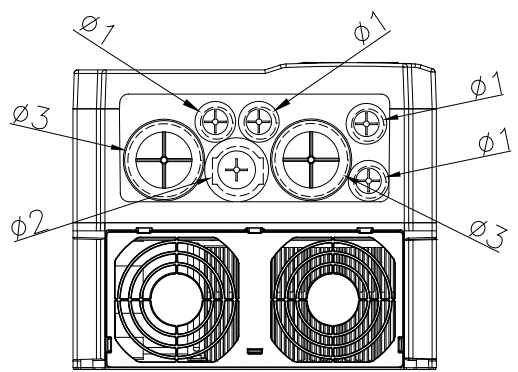
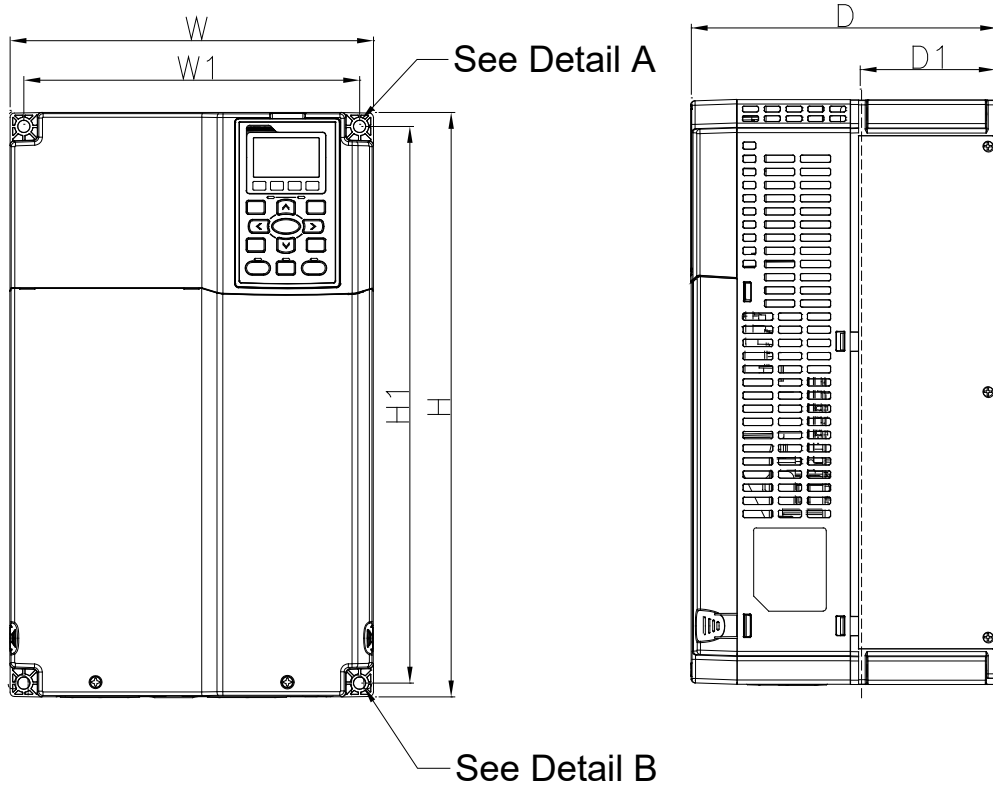
Detail B (Mounting Hole)

Unit : mm [inch]

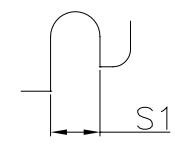
Frame	W	H	D	W1	H1	D1*	S1	$\phi 1$	$\phi 2$	$\phi 3$
B	190.0 [7.48]	320.0 [12.60]	190.0 [7.48]	173.0 [6.81]	303.0 [11.93]	77.9 [3.07]	8.5 [0.33]	22.2 [0.87]	34.0 [1.34]	43.8 [1.72]

D1* : Flange Mount

VFD185CH43A-21, VFD220CH43A-21, VFD300CH43A-21



Detail A (Mounting Hole)



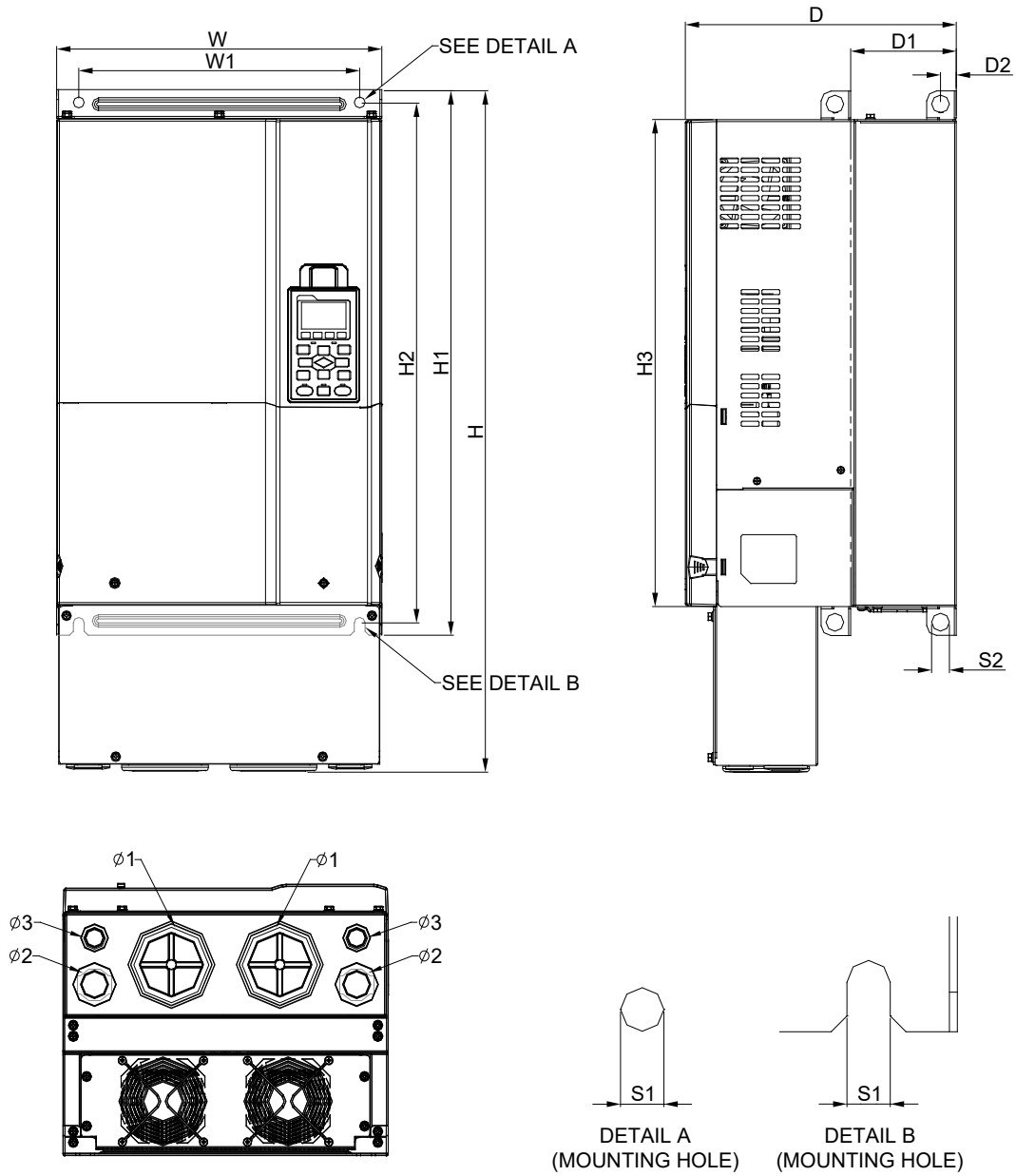
Detail B (Mounting Hole)

Unit : mm [inch]

Frame	W	H	D	W1	H1	D1*	S1	$\phi 1$	$\phi 2$	$\phi 3$
C	250.0 [9.84]	400.0 [15.75]	210.0 [8.27]	231.0 [9.09]	381.0 [15.00]	92.9 [3.66]	8.5 [0.33]	22.2 [0.87]	34.0 [1.34]	50.0 [1.97]

D1* : Flange Mount

VFD550CH43A-21, VFD750CH43A-21

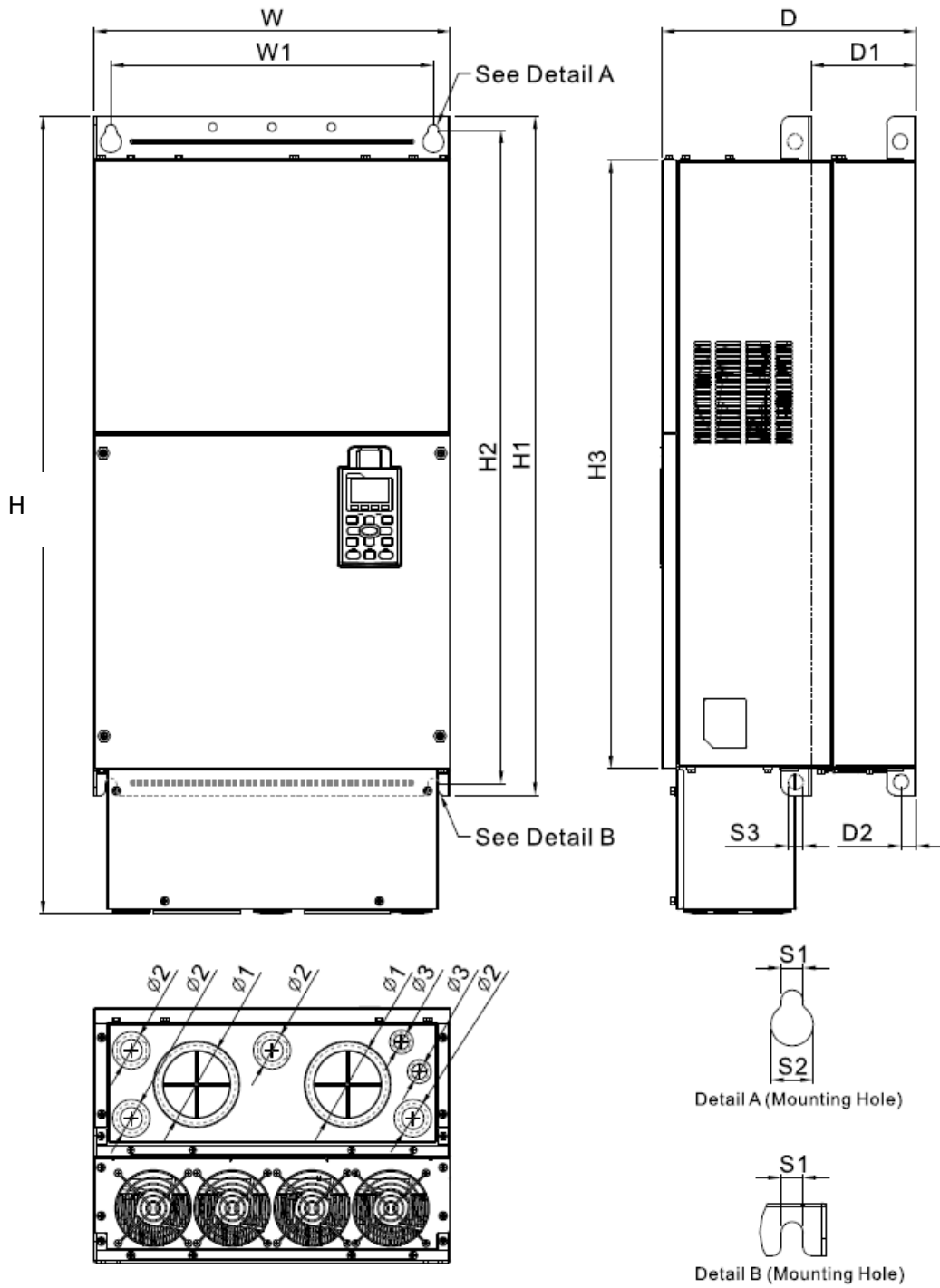


Unit : mm[inch]

Frame	W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	Φ1	Φ2	Φ3
D2	330.0 [12.99]	688.3 [27.10]	275.0 [10.83]	285.0 [11.22]	550.0 [21.65]	525.0 [20.67]	492.0 [19.37]	107.2 [4.22]	16.0 [0.63]	11.0 [0.43]	18.0 [0.71]	76.2 [3.00]	34.0 [1.34]	22.0 [0.87]

D1* : Flange Mount

VFD1320CH43A-21

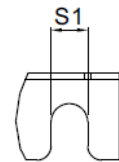
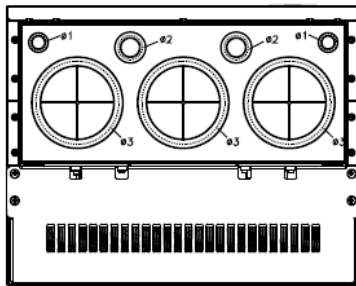
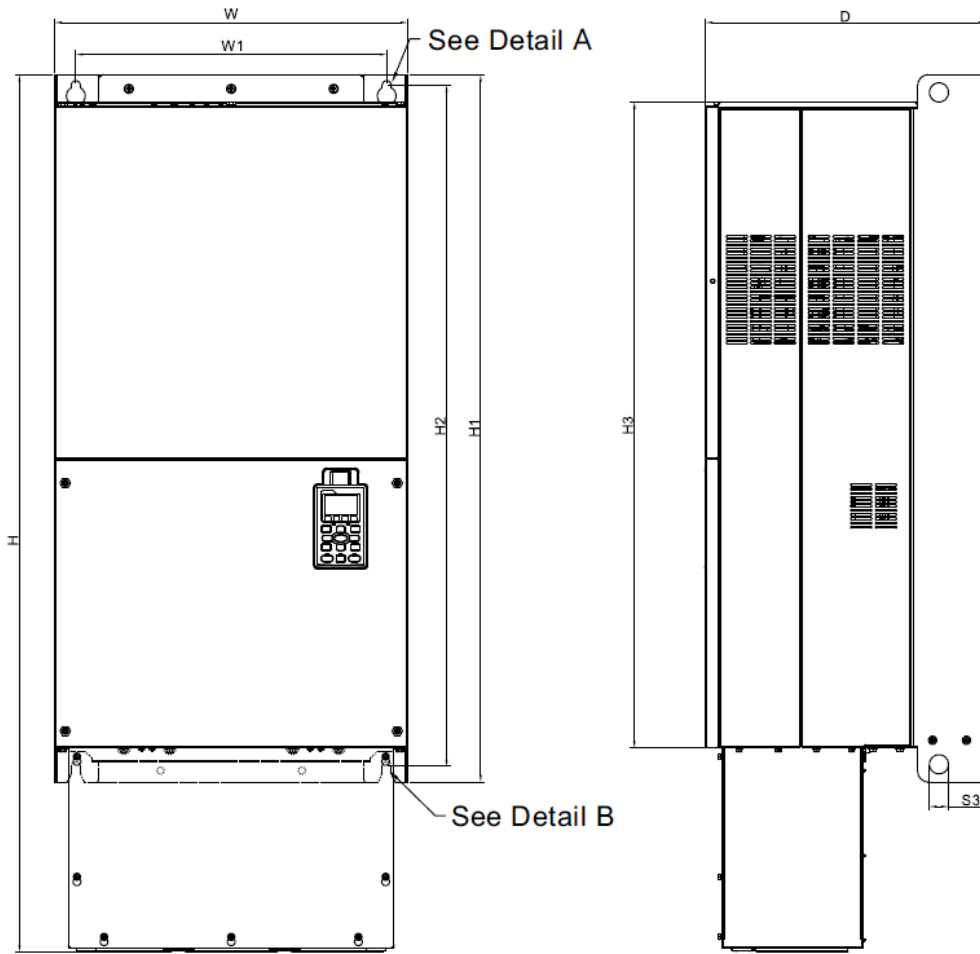


Unit : mm[inch]

Frame	W	H	D	W1	H1	H2	H3	D1*	D2	S1	S2	S3	$\phi 1$	$\phi 2$	$\phi 3$
F2	420.0 [16.54]	940.0 [37.00]	300.0 [11.81]	380.0 [14.96]	800.0 [31.5]	770.0 [30.32]	717.0 [28.23]	124.0 [4.88]	18.0 [0.71]	13.0 [0.51]	25.0 [0.98]	18.0 [0.71]	92.0 [3.62]	35.0 [1.38]	22.0 [0.87]

D1* : Flange Mount

VFD1600CH43A-21, VFD2200CH43A-21

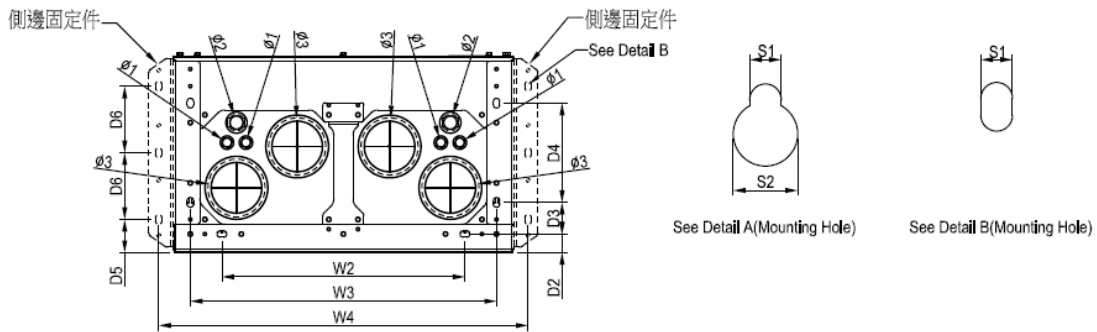
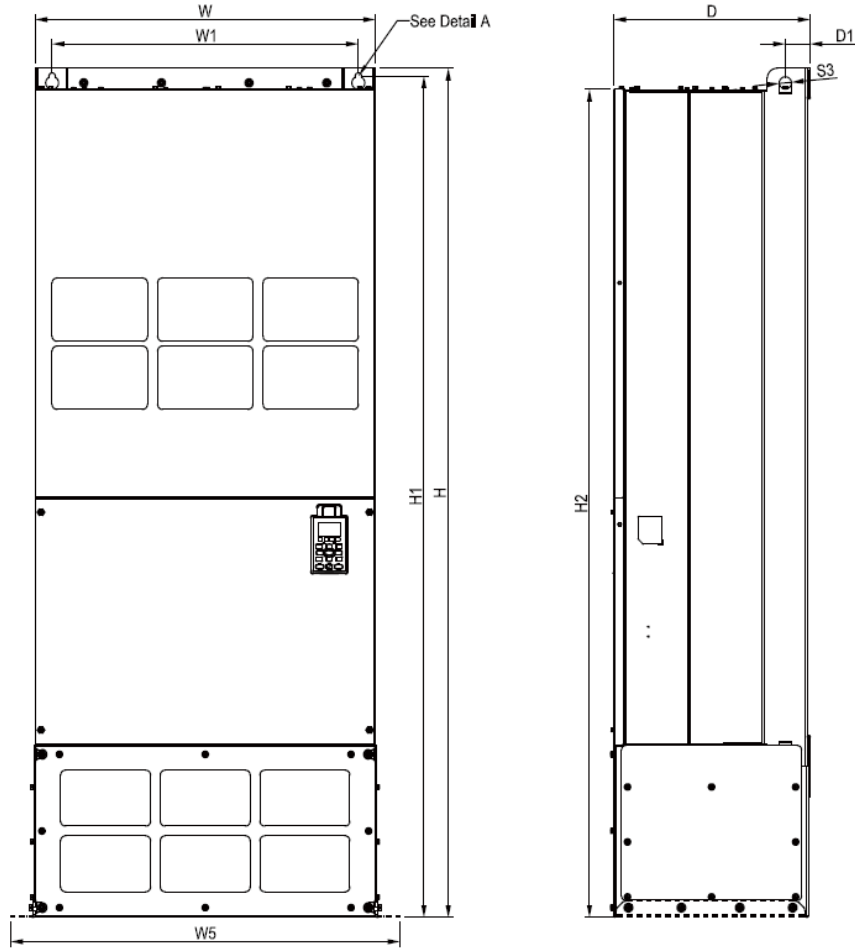


Detail a (MountingHole) Detail B (MountingHole)

Unit : mm[inch]

Frame	W	H	D	W1	H1	H2	H3	S1	S2	S3	$\Phi 1$	$\Phi 2$	$\Phi 3$
G2	500.0 [19.69]	1240.2 [48.83]	397.0 [12.63]	440.0 [17.32]	1000.0 [39.37]	963.0 [37.91]	913.6 [35.97]	13.0 [0.51]	26.5 [1.04]	27.0 [1.06]	22.0 [0.87]	34.0 [1.34]	117.5 [4.63]

VFD2800CH43C-21



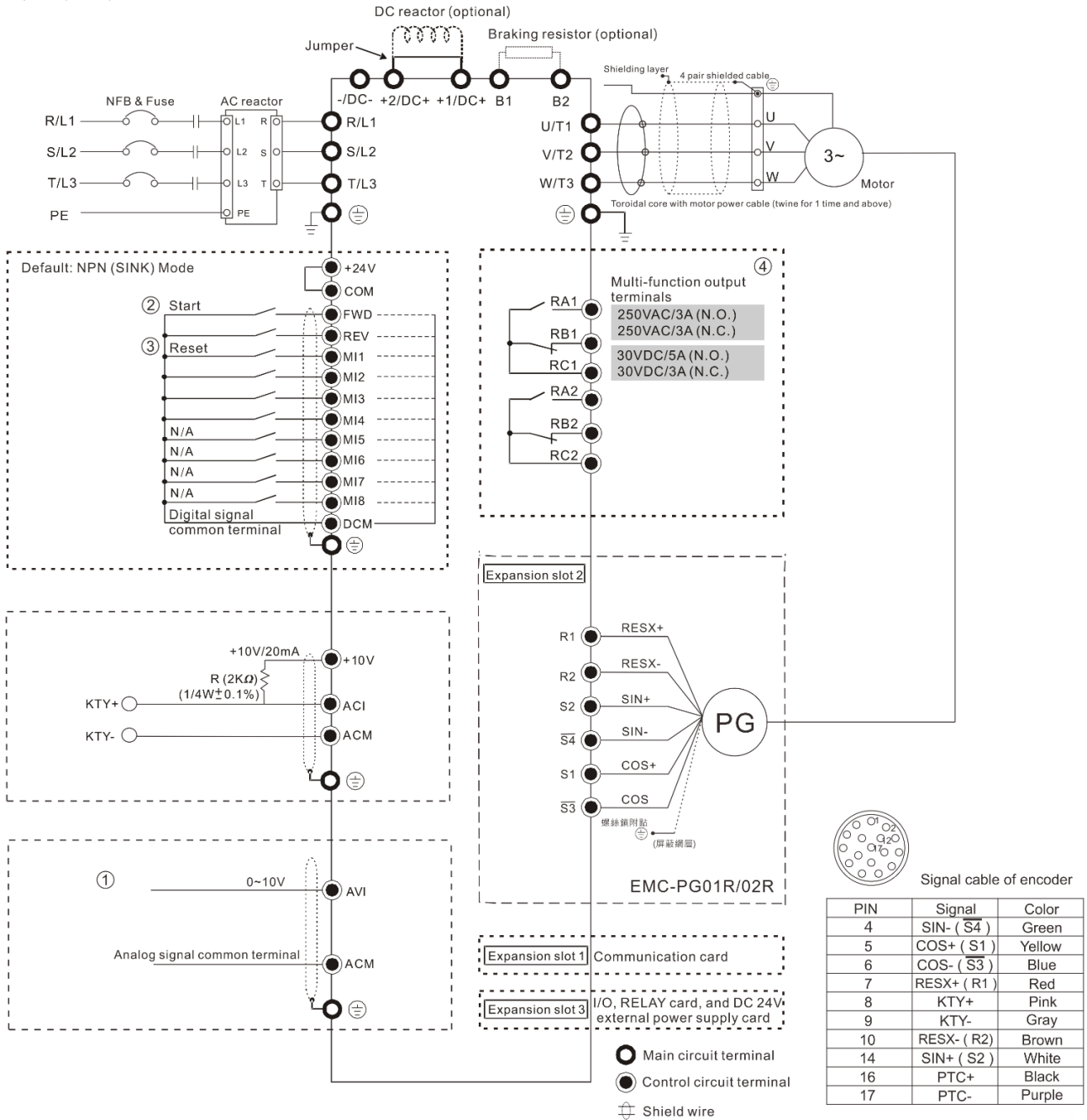
Unit : mm[inch]

Frame	W	H	D	W1	W2	W3	W4	W5	W6	H1	H2	H3	H4
H3	700.0	1745.0	404.0	630.0	500.0	630.0	760.0	800.0	-	1729.0	1701.6	-	-
	[27.56]	[68.7]	[15.9]	[24.80]	[19.69]	[24.80]	[29.92]	[31.5]	[-]	[68.07]	[66.99]	[-]	[-]
	H5	D1	D2	D3	D4	D5	D6	S1	S2	S3	Φ1	Φ2	Φ3
	-	51.0	38.0	65.0	204.0	68.0	137.0	13.0	26.5	25.0	22.0	34.0	117.5
	[-]	[2.0]	[1.5]	[2.56]	[8.03]	[2.68]	[5.4]	[0.51]	[1.04]	[0.98]	[0.87]	[1.34]	[4.63]

6. Wiring

VFD150CH43A~VFD300CH43A (15kW~30kW)

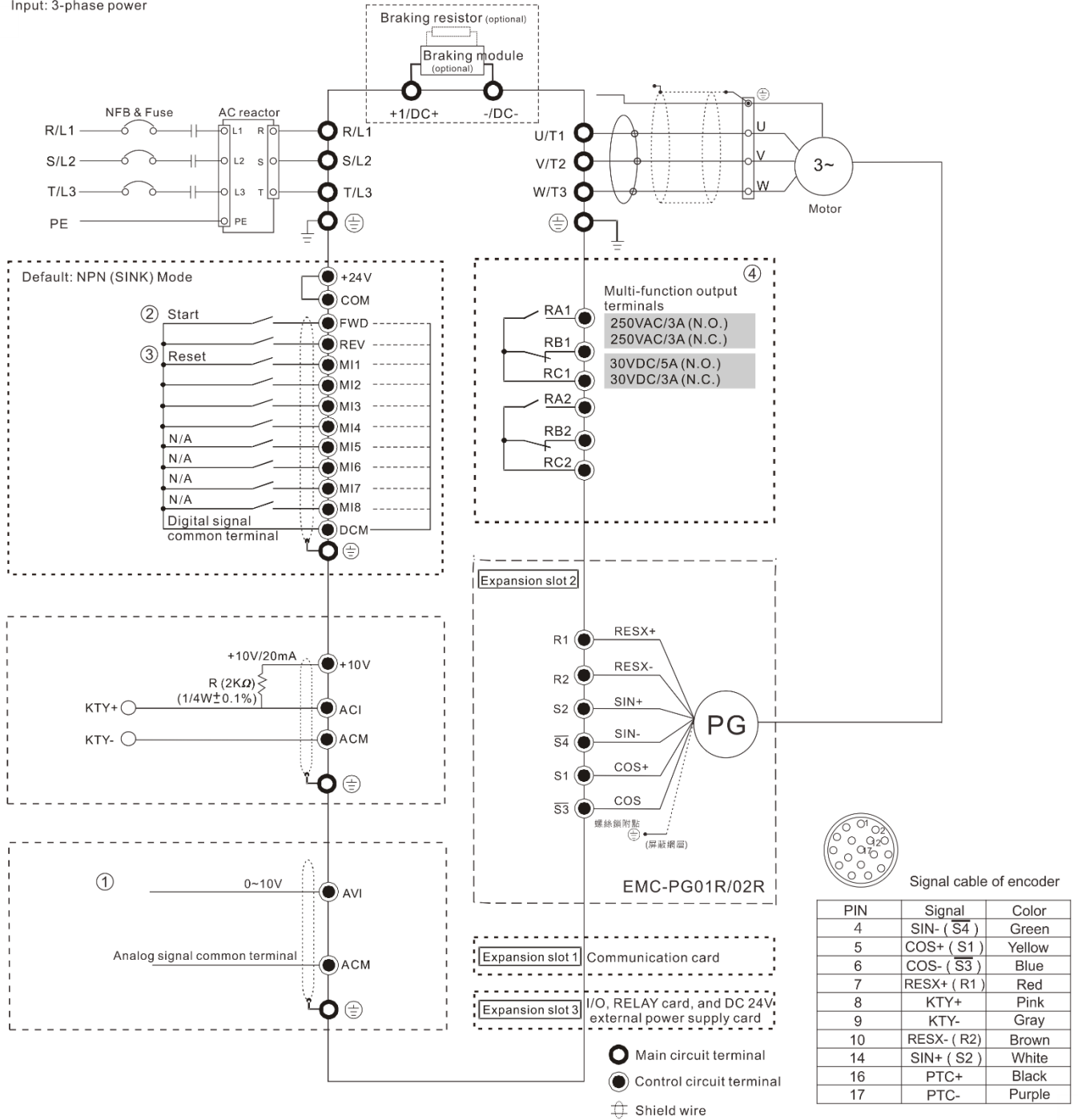
Wiring Diagram for Frame A~C
Input: 3-phase power



- ① Speed Command Input → Signal: 0-10V, AVI: +, ACM: -
- ② Motor Start Signal → FWD-DCM (FWD: Signal, DCM: COM)
- ③ Reset Signal → MI1-DCM (MI1: Signal, Parameter: 02-01 = 5)
- ④ Multi-function Output → RA1-RC1 (Normal open), RB1-RC1 (Normal close)

VFD370CH43A~VFD1320CH43A (37kW~132kW)

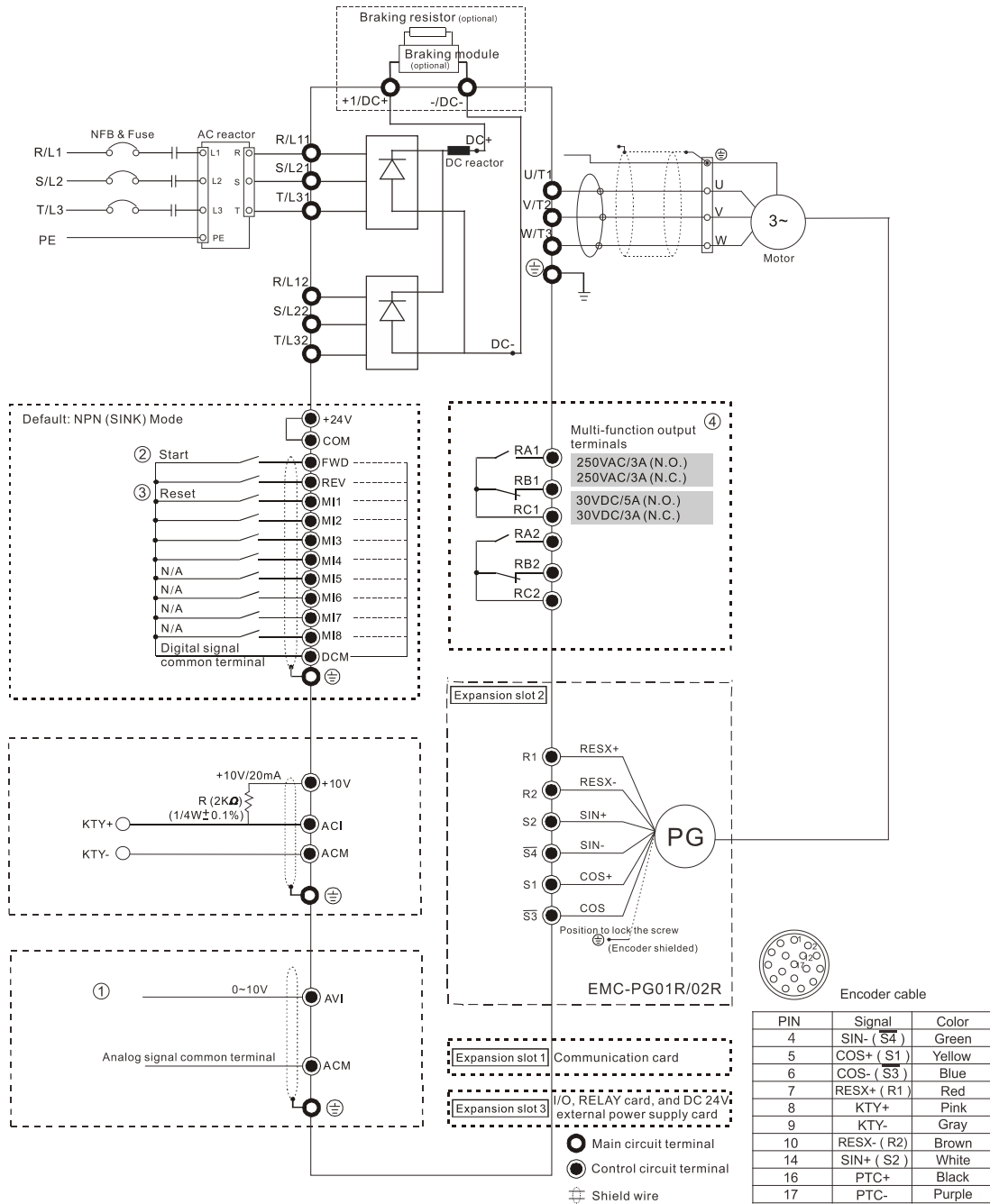
Wiring Diagram for Frame D~F
Input: 3-phase power



- ① Speed Command Input → Signal: 0-10V, AVI: +, ACM: -
- ② Motor Start Signal → FWD-DCM (FWD: Signal, DCM: COM)
- ③ Reset Signal → MI1-DCM (MI1: Signal, Parameter: 02-01 = 5)
- ④ Multi-function Output → RA1-RC1 (Normal open), RB1-RC1 (Normal close)

VFD1600CH43A~VFD2800CH43C (160kW~280kW)

Wiring Diagram for Frame G~H
Input: 3-phase power



- ① Speed Command Input → Signal: 0-10V, AVI: +, ACM: -
- ② Motor Start Signal → FWD-DCM (FWD: Signal, DCM: COM)
- ③ Reset Signal → MI1-DCM (MI1: Signal, Parameter: 02-01 = 5)
- ④ Multi-function Output → RA1-RC1 (Normal open), RB1-RC1 (Normal close)

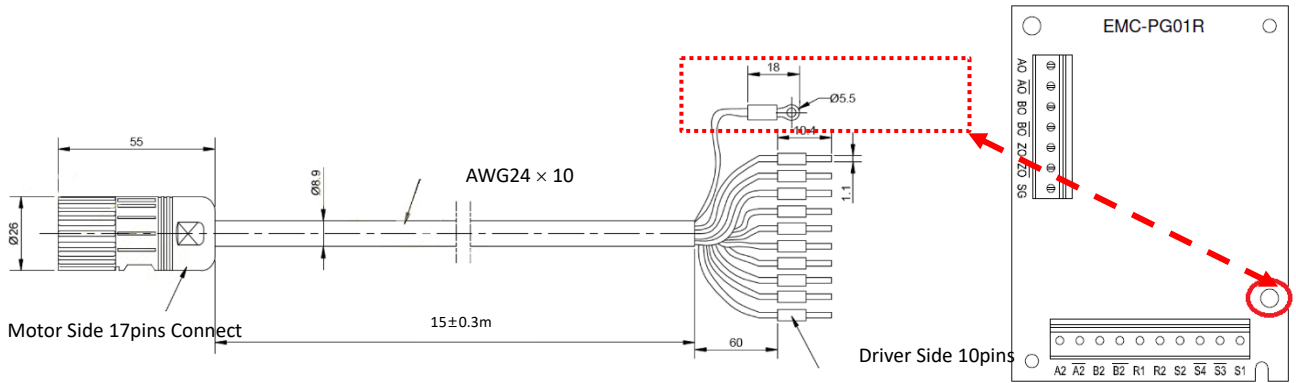
■ **Motor Power Cable (U, V, W): 600V / 90°C Wire**

Model Name MST-_____		UR311FF75D	TR402CF86D	SR403AF86D	SR485FxA0D	SR617FxB0D RR617FxB0D
Wire Spec.	AWG	6	5	4	1	2/0
	mm ²	13.5	17	21	42.5	67.5

Model Name MST-_____		QR65D2xC5D	RR65G0xC5D QR84G0XG0D	QR84M0xI0D	QR84S0xI0D
Wire Spec.	AWG	AWG 3/0	AWG 2/0 ×2	AWG 3/0 ×2	AWG 0 ×4
	mm ²	85	135	170	214

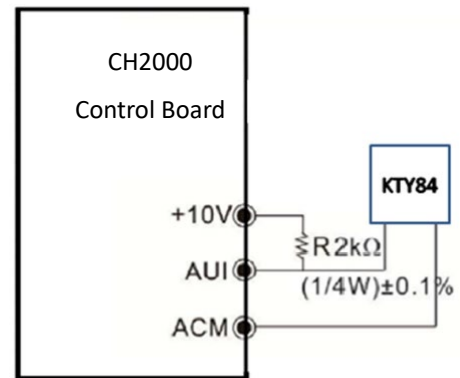
■ **Encoder Cable**

- ◇ Encoder Cable is 17pins connector in the motor side and the other side is the pin terminals. Please refer to the table below for the wire definition.
- ◇ The shield wire of the encoder cable must be grounded with the PG card. (Please see the picture below)



- ◇ Motor temperature protection is worked through the KTY84-130 temperature sensor. Please follow the wiring diagram below.

Encoder Cable Definition on Motor Terminal Box		
Pin#	Signal	Wire Color
4	SIN- (/S4)	Green
5	COS+ (S1)	Yellow
6	COS- (/S3)	Blue
7	RESX+	Red
8	KTY+	Pink
9	KTY-	Gray
10	RESX-	Brown
14	SIN+ (S2)	White
16	PTC+	Black
17	PTC-	Orange



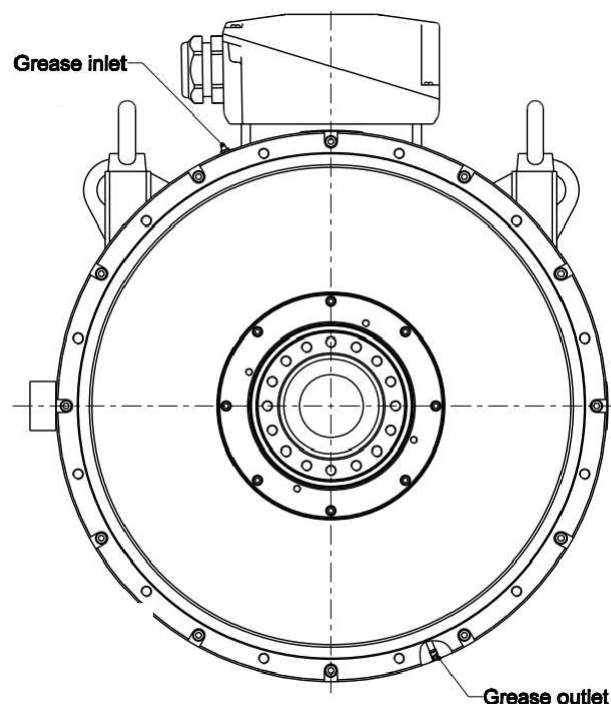
7. Replenishment and Replacement of Bearing Grease

(For 55kW and above)

There are grease inlet and outlet holes at the upper and lower positions of the motor output shaft side flange. The inlet hole is used for adding grease to bearing and the outlet hole is for discharging. In order to avoid filling too much grease, open the outlet hole during refilling the grease and drain the excessive grease. End users can install different Copper nipples to do grease maintenance. AS shown below.

Precautions:

1. New products shipped from factory are filled with sufficient lubricant oil. This is the brand and model of the grease: **SKF Bearing grease LGHP 2**. You don't need to add extra grease to avoid excessive amount of grease. If you inject too much grease, it can spill from the two sides of the bearing and somewhere from the flange. That will damage the motor and shorten its lifespan
2. When you've used this motor for a long period, you need keep on using the same type of grease of the same brand when replenishing. Do NOT use any other type of grease. Only when the motor is running, you can replenish the grease. Inject the grease from the oil inlet several times. See the table below for the time interval and required quantity of replenishment. Make appropriate adjustments to fit different applications and environments
3. If you need to refill or replace completely the grease in the bearing chamber, make sure that the grease is new and clean. Only when the motor is running, you can do the grease replacement. To replace completely the grease, you need to fill in the new one and drain out the old one at the same time. Repeat this fill-in and drain-out process several times until you fill completely the bearing chamber with the new grease.
4. The aging speed of the grease increases as the temperature rises. When the working temperature is higher than 70°C, we recommend to reduce the portion of grease replenishment by 50% as the temperature increases by 15°C.



Brand and Model of Grease: SKF Bearing grease LGHP 2			
Motor Model Name	SKF bearing model name (Cylindrical Roller Bearings)	Replenishment interval (Working hours)	Supply (g) <Replenishing>
MST-SR485FxA0D	NU-1030-ML	1800	40
MST-SR617FxB0D	NU-1034-ML	1800	55
MST-RR617FxB0D	NU-1034-ML	1800	55
MST-QR65D2xC5D	NU-1038-MA	1800	67
MST-RR65G0xC5D	NU-1038-MA	1800	67
MST-QR84G0xG0D	NU-1048-MA	1200	101
MST-QR84M0xI0D	NU-1056-MA	1200	137
MST-QR84S0xI0D	NU-1056-MA	1200	137

Cautions

1. Motor must be operated with forced oil cooling pump, the inlet temperature should be under or equal 40°C. And the pressure at the oil inlet of motor should be less or equal to 8bar.
2. We strongly recommended using oil cooling, the cooling oil specification listed as below table. If water cooling is needed, please contact Delta Electronics for details.

Oil Type : ISO VG46
Viscosity : 46 mm ² /s (@40°C)
Density : 871 kg/m ³
Specific heat capacity: 2097 J/kg·K

3. Motor should be operated under temperature -15 ~ 40°C, Humidity 20 ~ 90% RH (Non condensation) and Altitude <1000m.
4. When the motor is hanging, be sure to use special hanging holes on the motor side/top, do not force the hook or sling on the motor shaft.
5. When mounting the motor, do not apply "axial force" or use any tool to hit the motor shaft and front / rear end cover.
6. When connecting the motor shaft with the load shaft, keep the motor horizontal and the two axes aligned with each other. Concentricity deviation should be less than 0.04mm.
7. Before the motor is running, make sure that the temperature protection KTY84-130 of the motor is connected to the corresponding terminals on the drive, and it is forbidden to operate the motor without the protection.
8. During the operation, if abnormal sounds or overheating occurs, please do stop the motor immediately and check it out until the problem is solved.

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Industrial Automation Headquarters

Delta Electronics, Inc.

Taoyuan Technology Center
No.18, Xinglong Rd., Taoyuan District, Taoyuan City 33068, Taiwan
TEL: 886-3-362-6301 / FAX: 886-3-371-6301

Asia

Delta Electronics (Shanghai) Co., Ltd.

No.182 Minyu Rd., Pudong Shanghai, P.R.C.
Post code : 201209
TEL: 86-21-6872-3988 / FAX: 86-21-6872-3996
Customer Service: 400-820-9595

Delta Electronics (Japan), Inc.

Tokyo Office
Industrial Automation Sales Department
2-1-14 Shibadaimon, Minato-ku, Tokyo, Japan 105-0012
TEL: 81-3-5733-1155 / FAX: 81-3-5733-1255

Delta Electronics (Korea), Inc.

Seoul Office
1511, 219, Gasan Digital 1-Ro., Geumcheon-gu, Seoul, 08501 South Korea
TEL: 82-2-515-5305 / FAX: 82-2-515-5302

Delta Energy Systems (Singapore) Pte Ltd.

4 Kaki Bukit Avenue 1, #05-04, Singapore 417939
TEL: 65-6747-5155 / FAX: 65-6744-9228

Delta Electronics (India) Pvt. Ltd.

Plot No.43, Sector 35, HSIIDC Gurgaon, PIN 122001, Haryana, India
TEL: 91-124-4874900 / FAX : 91-124-4874945

Delta Electronics (Thailand) PCL.

909 Soi 9, Moo 4, Bangpoo Industrial Estate (E.P.Z), Pattana 1 Rd.,
T.Phraksa, A.Muang, Samutprakarn 10280, Thailand
TEL: 66-2709-2800 / FAX : 662-709-2827

Delta Energy Systems (Australia) Pty Ltd.

Unit 20-21/45 Normanby Rd., Notting Hill Vic 3168, Australia
TEL: 61-3-9543-3720

Americas

Delta Electronics (Americas) Ltd.

Raleigh Office
P.O. Box 12173, 5101 Davis Drive, Research Triangle Park, NC 27709,
U.S.A.
TEL: 1-919-767-3813 / FAX: 1-919-767-3969

Delta Greentech (Brasil) S/A

São Paulo Office
Rua Itapeva, 26 – 3º Andar - Bela Vista
CEP: 01332-000 – São Paulo – SP - Brasil
TEL: 55-11-3530-8642 / 55-11-3530-8640

Delta Electronics International Mexico S.A. de C.V.

Mexico Office
Via Dr. Gustavo Baz No. 2160, Colonia La Loma, 54060 Tlalnepantla
Estado de Mexico
TEL: 52-55-2628-3015 #3050/3052

EMEA

Headquarters: Delta Electronics (Netherlands) B.V.

Sales: Sales.IA.EMEA@deltaww.com
Marketing: Marketing.IA.EMEA@deltaww.com
Technical Support: iatechnicalsupport@deltaww.com
Customer Support: Customer-Support@deltaww.com
Service: Service.IA.emea@deltaww.com
TEL: +31(0)40 800 3800

BENELUX: Delta Electronics (Netherlands) B.V.

De Witbogt 20, 5652 AG Eindhoven, The Netherlands
Mail: Sales.IA.Benelux@deltaww.com
TEL: +31(0)40 800 3800

DACH: Delta Electronics (Netherlands) B.V.

Coesterweg 45, D-59494 Soest, Germany
Mail: Sales.IA.DACH@deltaww.com
TEL: +49(0)2921 987 0

France: Delta Electronics (France) S.A.

ZI du bois Challand 2, 15 rue des Pyrénées, Lisses, 91090 Evry Cedex,
France
Mail: Sales.IA.FR@deltaww.com
TEL: +33(0)1 69 77 82 60

Iberia: Delta Electronics Solutions (Spain) S.L.U

Ctra. De Villaverde a Vallecas, 265 1º Dcha Ed.
Hormigueras – P.I. de Vallecas 28031 Madrid
TEL: +34(0)91 223 74 20
C/Llull, 321-329 (Edificio CINC) | 22@Barcelona, 08019 Barcelona
Mail: Sales.IA.Iberia@deltaww.com
TEL: +34 93 303 00 60

Italy: Delta Electronics (Italy) S.r.l.

Ufficio di Milano Via Senigallia 18/2 20161 Milano (MI)
Piazza Grazioli 18 00186 Roma Italy
Mail: Sales.IA.Italy@deltaww.com
TEL: +39 02 64672538

Russia: Delta Energy System LLC

Vereyskaya Plaza II, office 112 Vereyskaya str. 17 121357 Moscow
Russia
Mail: Sales.IA.RU@deltaww.com
TEL: +7 495 644 3240

Turkey: Delta Greentech Elektronik San. Ltd. Sti. (Turkey)

Şerifali Mah. Hendem Cad. Kule Sok. No:16-A
34775 Ümraniye – İstanbul
Mail: Sales.IA.Turkey@deltaww.com
TEL: + 90 216 499 9910

GCC: Delta Energy Systems AG (Dubai BR)

P.O. Box 185668, Gate 7, 3rd Floor, Hamarain Centre
Dubai, United Arab Emirates
Mail: Sales.IA.MEA@deltaww.com
TEL: +971(0)4 2690148

Egypt + North Africa: Delta Electronics

511 Cairo Business Plaza, North 90 street, New Cairo, Cairo, Egypt
Mail: Sales.IA.MEA@deltaww.com

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