

## Servo Pump System introduction

V1.0\_Jan31,2018\_PMTS

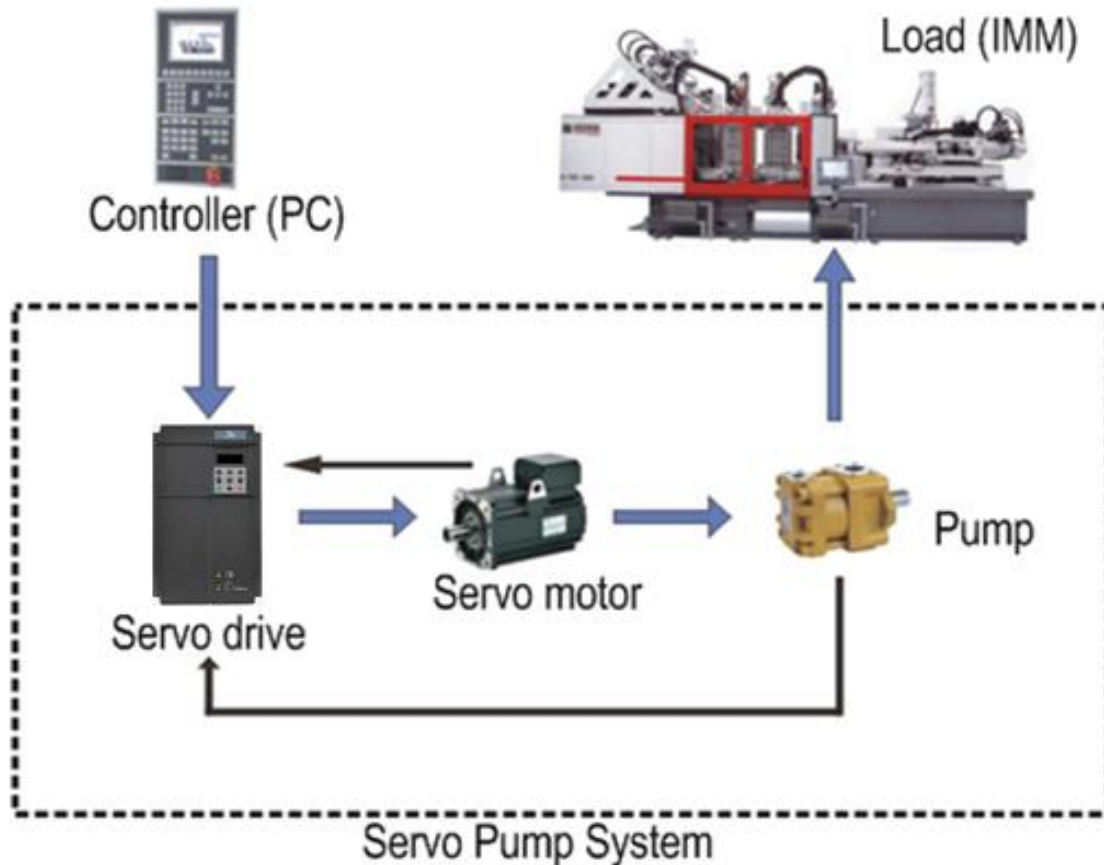
**I**

# **Basic Principles**

# 1. Structure of Servo Pump System

Servo pump system is configured between the controller and load (injection molding machine), and is used to control motions of the load according to commands transmitted from the controller.

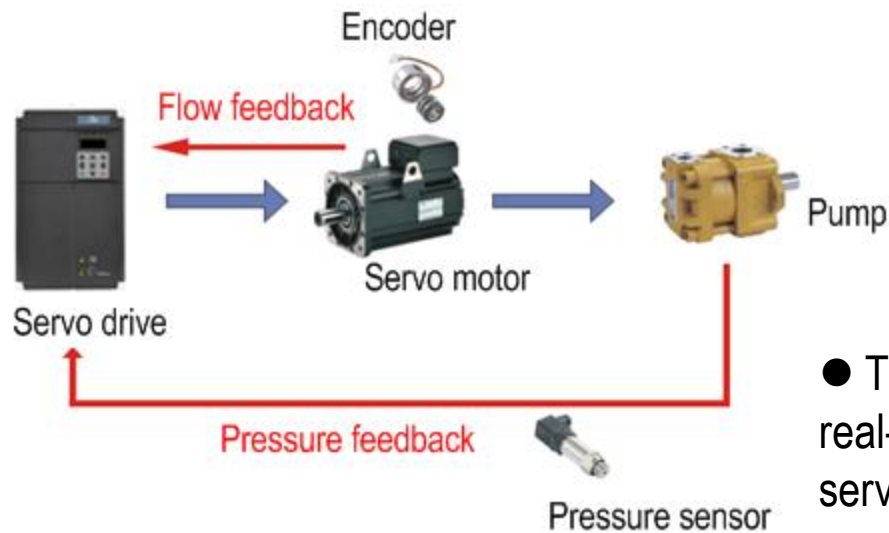
A servo pump system mainly consists of servo drive, servo motor and pump.



# 2. Feature of Servo Pump System

Feature: with pressure feedback loop and speed feedback loop

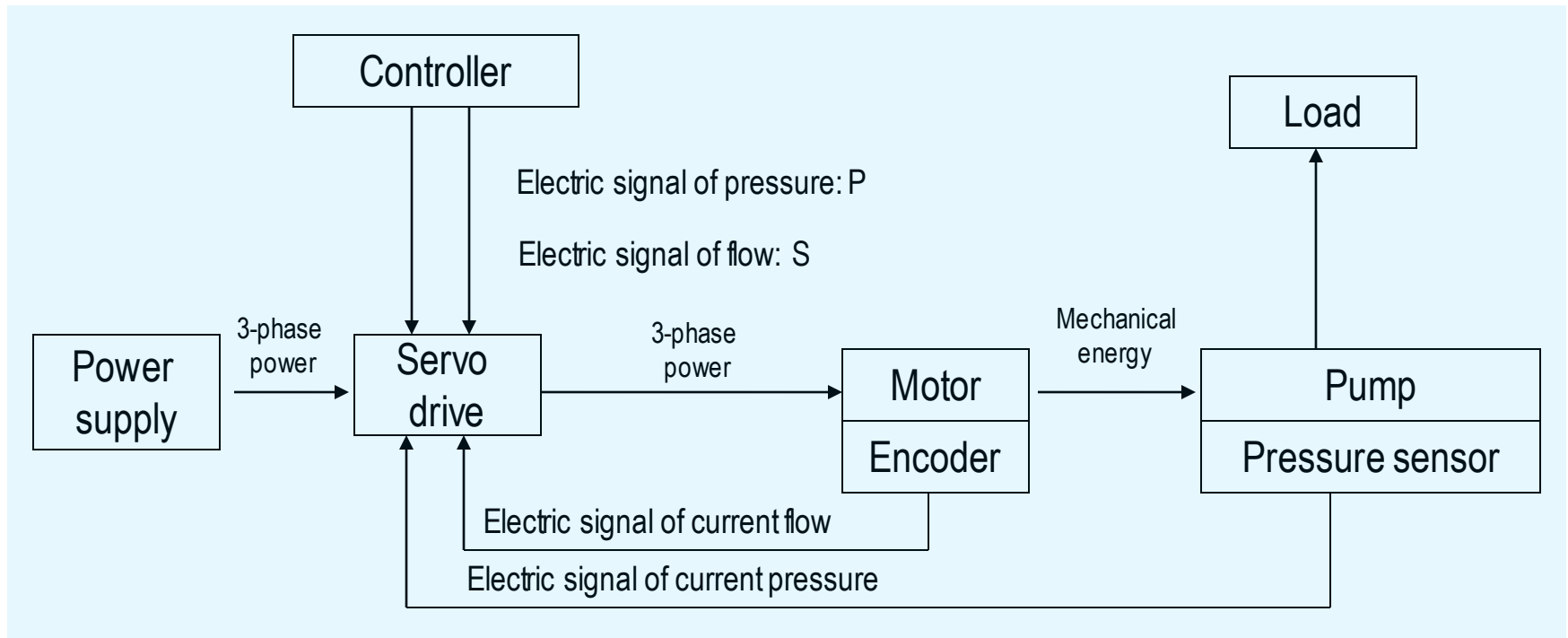
- The motor feeds back real-time flow (motor speed) to the servo drive through encoder(resolver).



- The servo drive compares the feedback pressure with the given pressure by the controller, and then adjusts its output to the servo motor, thus realizing dynamic control of the motor.

- The pump feeds back real-time pressure to the servo drive through the pressure sensor.

# 3. Signal Topology

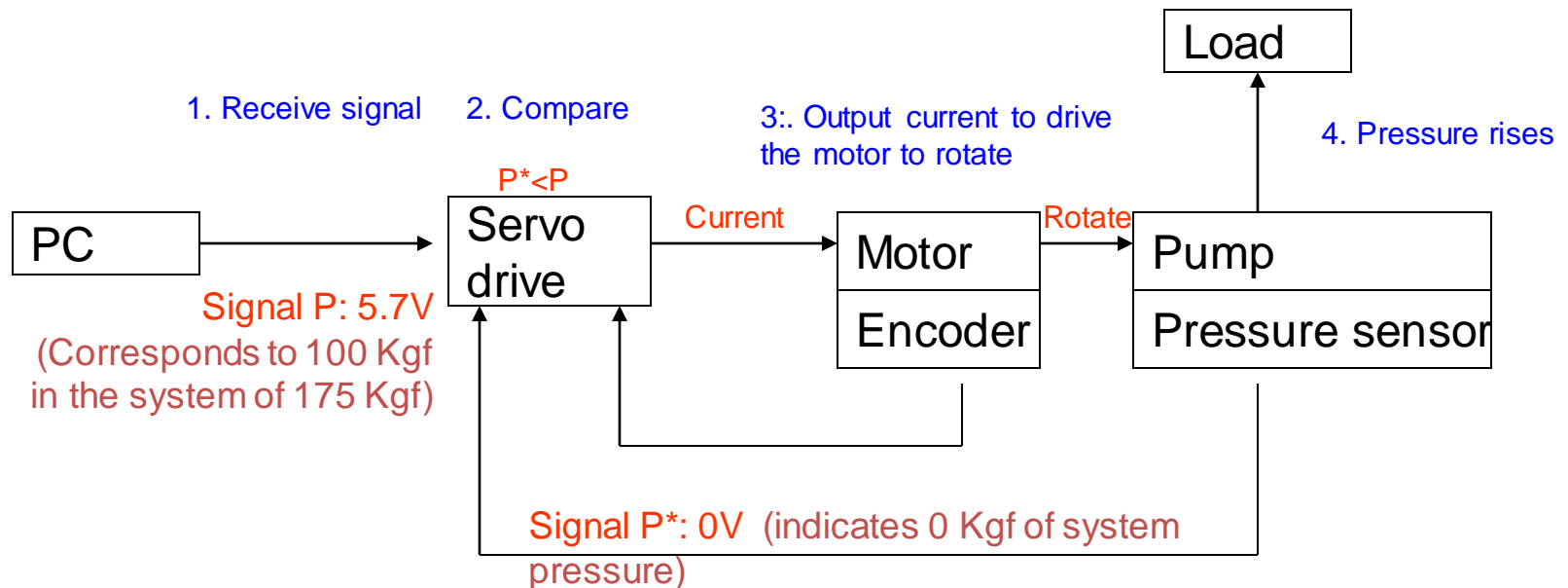


The Contact media between the controller and servo drive, and between the servo drive and other devices is electric signals. Different electric signals correspond to different pressure or flow values. For example, a pressure range of 0~250 bar corresponds to a voltage feedback of 0~10 V.

# 4. Example

The controller provides a pressure signal of 100 Kgf. The servo drive immediately receives the signal, and then compares it with the signal (assume it as 0 Kgf) fed back from the pressure sensor. Since the feedback 0 Kgf does not reach the preset signal 100 Kgf given by controller, the servo drive outputs current, driving the motor to speed up.

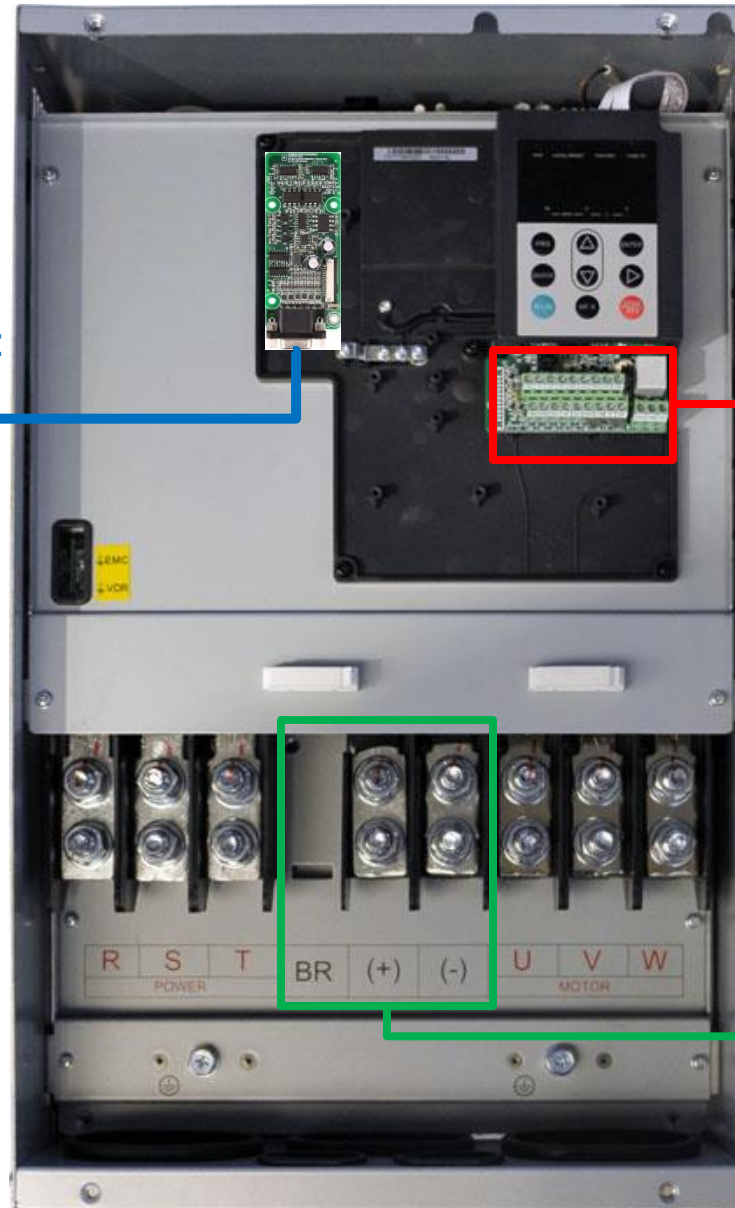
✚ During this process, system pressure keeps rising and the servo drives receives feedback signal continuously. Once the feedback signal reaches the preset value (100 Kgf), the entire control process is completed. Then the motor almost rotates at a constant speed.



II

## System wiring

# 1. Terminals overview



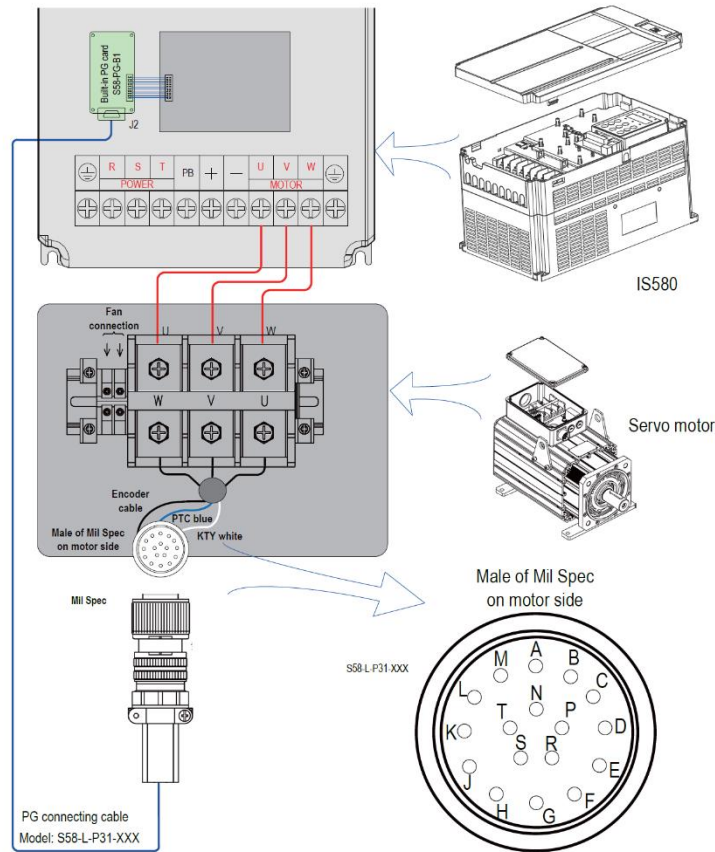
PG card (DB9 connector):  
connect with encoder  
(resolver) of motor  
(Details see following  
slides)

IO terminals for control  
(Details see following slides)

Connect with braking  
resistor or braking unit  
(Details see following  
slides)



# 2. Wiring of Encoder (Resolver)



17P Mil Spec.	A	B	C	D	E	F	G	H	L	K	J
D-type Connector 9-pin	1	2	3	4	5	9	7	8		6	Housing
Signal Definition	REF+	REF-	Cos+	Cos-	Sin+	Sin-	PTC-M	KTY-N	PTC-N	KTY-M	Shielding
Wire Colour	Yellow/White	Red/White	Red	Black	Yellow	Blue	Brown	Orange		Grey	Shielding
Remark	One pair		One pair		One pair			KTY, PTC common			

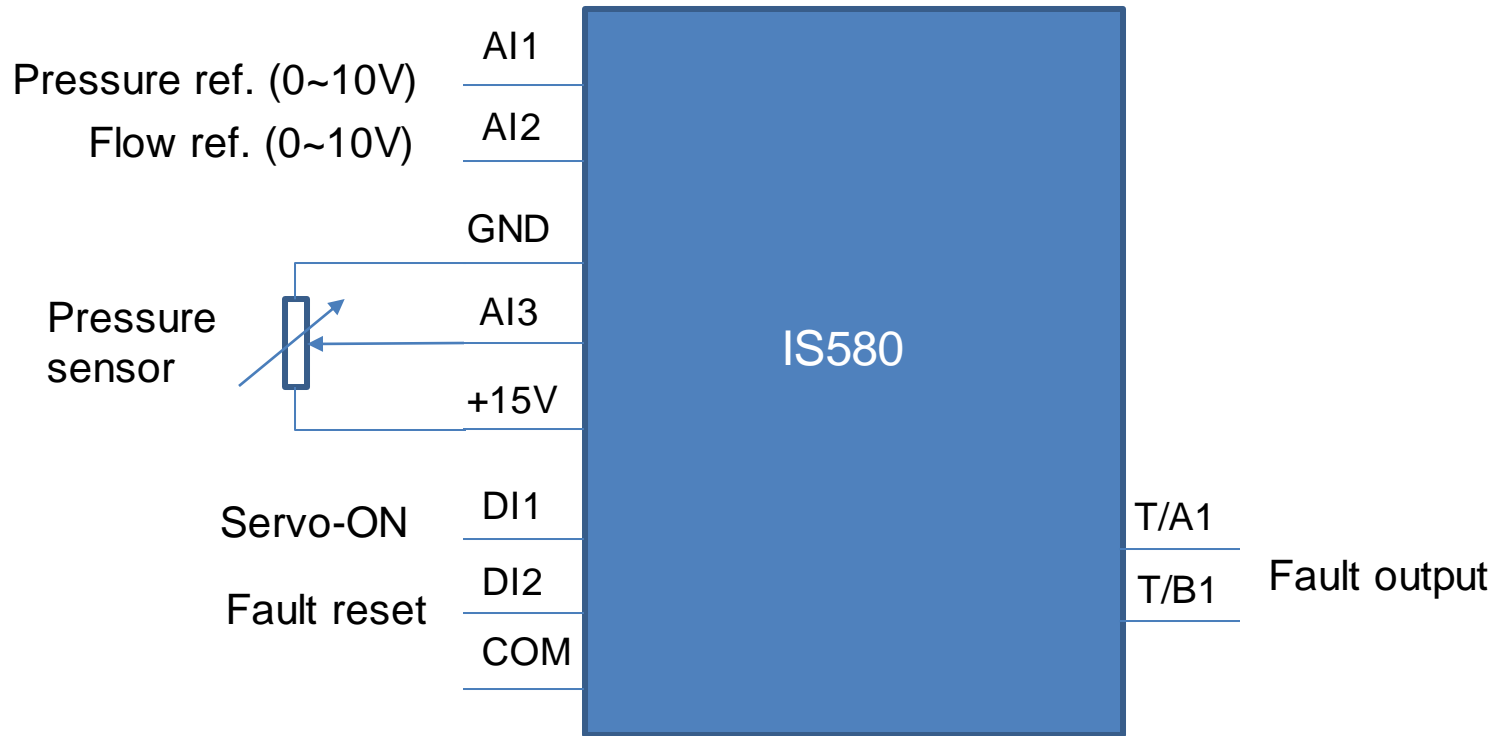
# 3. Wiring of Control IO



<b>CN2</b>	COM	DI1	DI2	DI3	DI4	DI5	COM	COM	DO1	
<b>CN1</b>	AI1	AI2	AI3	GND	+10V	+15V	GND	AO1	AO2	GND

<b>CN3</b>	T/A1	T/B1	T/C1	T/A2	T/C2
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# 3. Wiring of Control IO



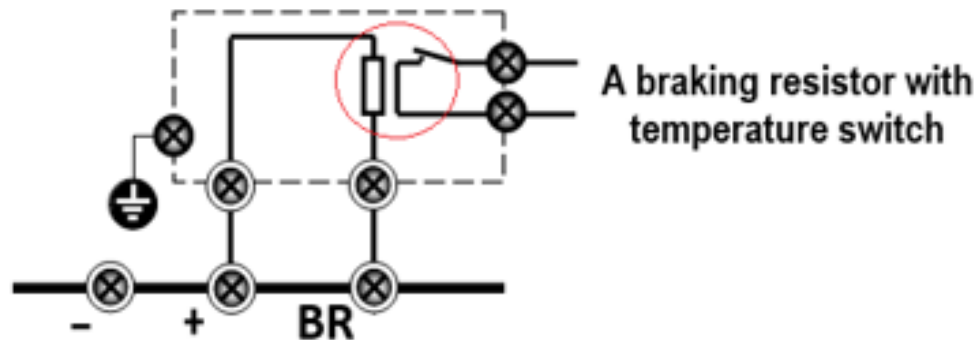
**Notes:** More specific drawing please see enclosed file:



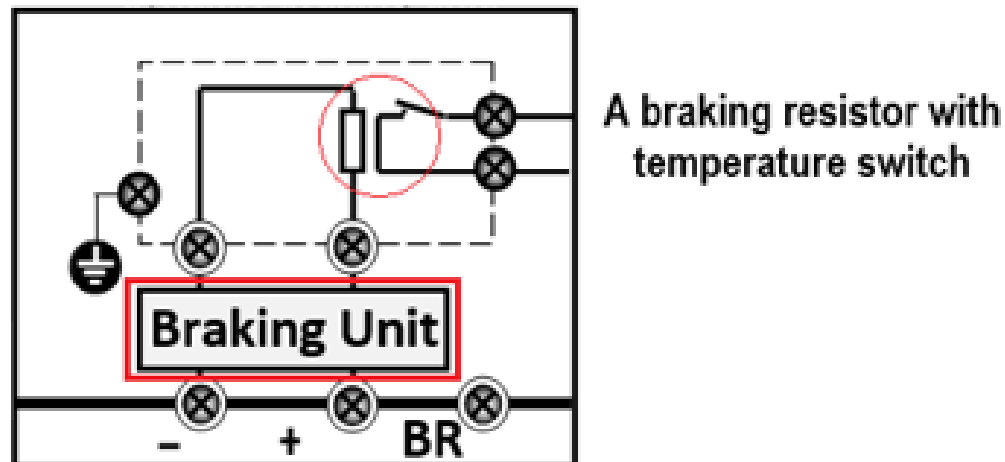
System wiring

# 4. Wiring of Braking resistor/Braking unit

IS580T020~140 and IS580-2T020~140 have In-built braking unit, thus just need to connect a braking resistor with BR and + terminals.

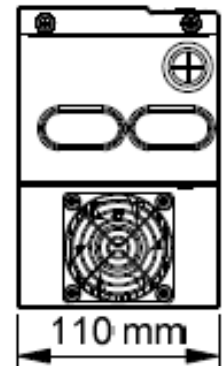
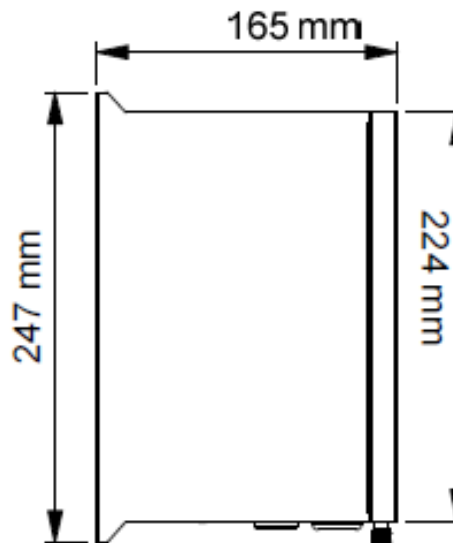
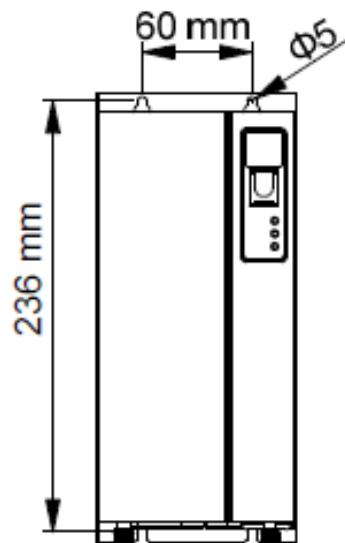


IS580T170~300 and IS580-2T170~300 require an optional external braking unit. More details of braking unit see following slides.



# External Braking Unit

Required for IS580-T170-R1-INT  $\geq$  above  
IS580-2T170-R1-INT  $\geq$  above



Model : MDBUN-60-5T & MDBUN-90-5T

Model : MDBUN-60-S & MDBUN-90-S

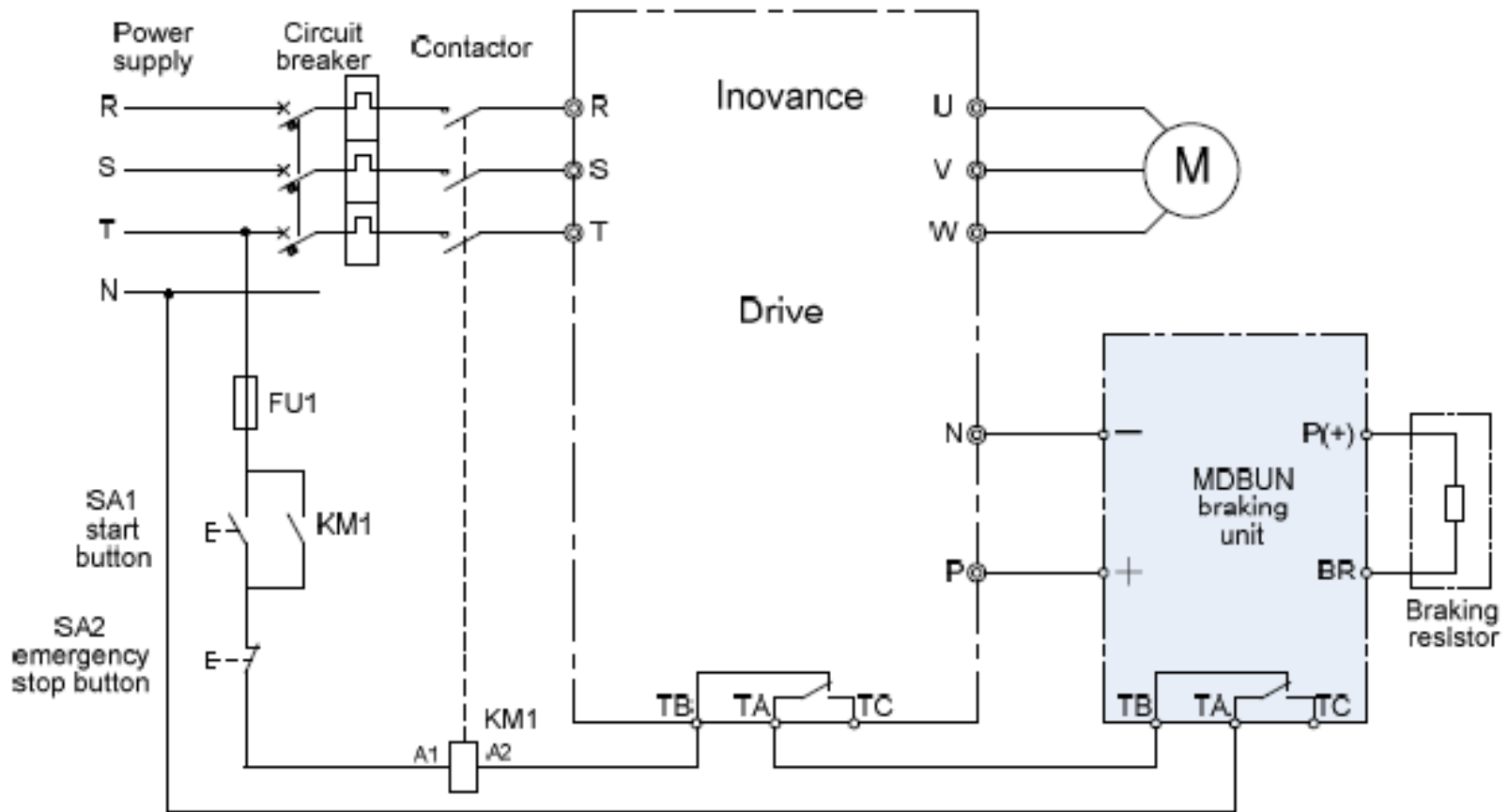
# External Braking Unit

IS580 Model	Recommended Value of Braking Resistor		Braking Unit	Remark
	Resistance	Power		
Three-phase 380 to 480 VAC, 50/60 Hz				
IS580T020-R1/IS580T020-R1-T	43 Ω	800 W	Built-in	-
IS580T030-R1/IS580T030-R1-T	32 Ω	1000 W		
IS580T035-R1/IS580T035-R1-T	25 Ω	1300 W		
IS580T040-R1/IS580T040-R1-T	25 Ω	1500 W		
IS580T050-R1	20 Ω	2500 W		
IS580T070-R1	16 Ω	3700 W		
IS580T080-R1	16 Ω	4500 W		
IS580T100-R1	16 Ω	5500 W		
IS580T140-R1	12 Ω	7500 W		
IS580T170-R1	12 Ω x 2	4500 W x 2	External	MDBUN-60-T x 2 (< 440 V) MDBUN-60-5T x 2 (> 440 V)
IS580T210-R1	12 Ω x 2	5500 W x 2	External	MDBUN-60-T x 2 (< 440 V) MDBUN-60-5T x 2 (> 440 V)
IS580T250-R1	6.3 Ω x 2	6500 W x 2	External	MDBUN-90-T x 2
IS580T300-R1	6.3 Ω x 2	16 kW	External	MDBUN-90-T x 2

## External Braking Unit

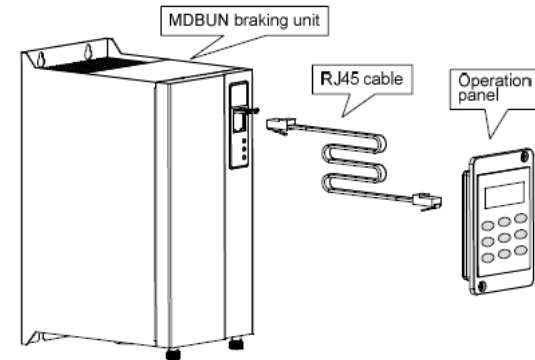
Three-phase 220 VAC, 50/60 Hz				
IS580-2T020-R1	22 $\Omega$	800 W	Built-in	-
IS580-2T030-R1	16 $\Omega$	1000 W		
IS580-2T040-R1	11 $\Omega$	1500 W		
IS580-2T050-R1	8 $\Omega$	2500 W		
IS580-2T070-R1	8 $\Omega$	3.7 kW		
IS580-2T080-R1	8 $\Omega$	4.5 kW		
IS580-2T100-R1	6 $\Omega$	5.5 kW		
IS580-2T140-R1	6 $\Omega$	7.5 kW		
IS580-2T170-R1	4 $\Omega$	9 kW	External	MDBUN-90-S
IS580-2T210-R1	4 $\Omega$	11 kW	External	MDBUN-90-S
IS580-2T300-R1	6 $\Omega$ x 2	8 kW x 2	External	MDBUN-60-S x 2

# External Braking Unit





# External Braking Unit



Function Code	Parameter Name	Setting Range	Parameter Description	Min. Unit	Default	Property
<b>Group F0</b>						
P0-00	Braking start voltage	Voltage class: 1) 220 V: P0-01 to 390.0 V 2) 380 V: P0-01 to 730.0 V 3) 480 V: P0-01 to 820.0 V	The braking unit starts braking when the bus voltage is higher than the value.	0.1 V	Voltage class: 1) 220 V: 350.0 V 2) 380 V: 670.0 V 3) 480 V: 760.0 V	☆
P0-01	Braking stop voltage	Voltage class: 1) 220 V: 320 V to P0-00 2) 380 V: 620 V to P0-00 3) 480 V: 700 V to P0-00	The braking unit stops braking when the bus voltage is lower than the value.	0.1 V	Voltage class: 1) 220 V: 340.0 V 2) 380 V: 650.0 V 3) 480 V: 730.0 V	☆



# INOVANCE

*Forward, Always Progressing !*