

# Using R88A-CA1G power cables

## Technical Note

### **BACKGROUND**

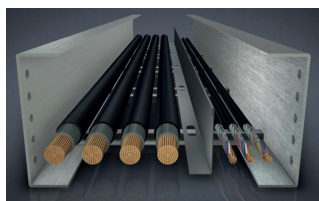
The R88A-CA1GxxxSF (without brake), R88A-CA1GxxxBF (with brake) and R88A-CA1GExxBF (extension) power cables are intended to be used with the following 1S servo motors:

- R88M-1L(4K0/5K0)30C-xS2
- R88M-1M(4K0/5K5)15C-xS2

The wire section has been optimized for the motor and the combination is suitable even in the limit conditions of ambient temperature and current.

The power cable increases its temperature due to Joule's effect and, in normal conditions, the heat produced is dissipated by natural convection, so the cable temperature remains below its maximum temperature (115°C).

However, when you use several motors in the same installation and their power cables travel together through the same duct, heat dissipation by natural convection is reduced due to mutual influence and the cable might exceed its maximum temperature.



In the next section you will find the guidelines to evaluate if the cable temperature reaches acceptable values in your current installation, depending on the motor model, the quantity of motors and the duct layout.

### **CASE EVALUATION**

Below you will find 3 cases. The conditions for the case evaluation are as follows:

- All motors are of the same size
- All motors work at 100% load (working at rated motor torque in average)
- Ambient temperature is the maximum specified

**Case 1:** Installation with several R88M-1L4K030C or R88M-1M4K015C motors

Arrangement	Number of motor power cables in the same duct						
	1	2	3	4	6	8	
S=d	OK	OK	NG	NG	NG	NG	
S=2d	---	OK	OK	OK	OK	OK	
S=3d	---	OK	OK	OK	OK	OK	

d = Cable diameter

S = Separation from center of cables

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### Case 2: Installation with several R88M-1L5K030C motors

Arrangement	Number of motor power cables in the same duct						
	1	2	3	4	6	8	
Arrangement							
S=d	OK	OK	NG	NG	NG	NG	
S=2d	---	OK	OK	OK	OK	OK	
S=3d	---	OK	OK	OK	OK	OK	

d = Cable diameter

S = Separation from center of cables

### Case 3: Installation with several R88M-1M5K515C motors

Arrangement	Number of motor power cables in the same duct						
	1	2	3	4	6	8	
Arrangement							
S=d	OK	OK	NG	NG	NG	NG	
S=2d	---	OK	OK	NG	NG	NG	
S=3d	---	OK	OK	OK	OK	NG	

d = Cable diameter

S = Separation from center of cables

If your arrangement results in NG, the power cable might reach excessive temperatures. The alternatives to build a proper installation are as follows:

- Split the power cables in 2 or more ducts
- Use a bigger duct where you can guarantee a bigger cable separation (increasing 'S' factor)
- Use the R88A-CA1H power cable instead of R88A-CA1G. It has a bigger section, so it produces less heat. With this cable there are no limitations in the duct configuration

In case you have a doubt or a different configuration, please contact your Omron representative.

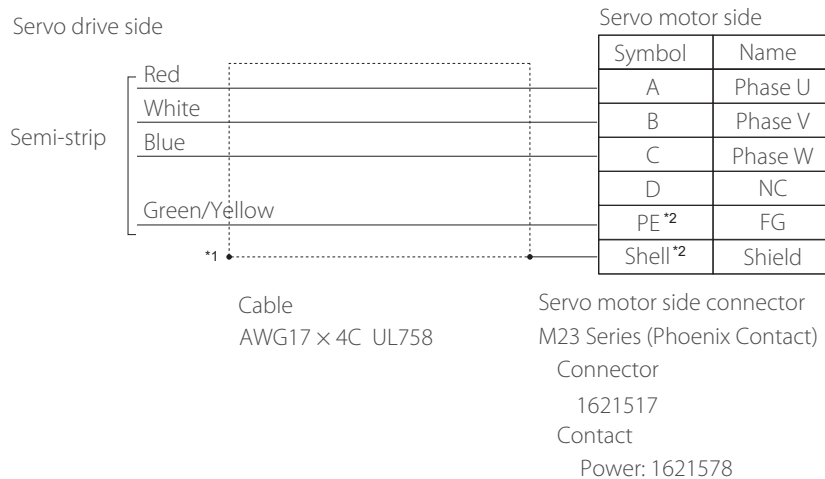
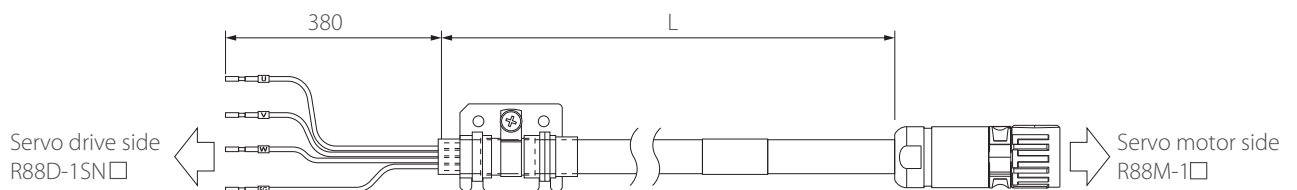
# Using R88A-CA1G power cables

## Technical Note

### SPECIFICATIONS / POWER CABLE WITHOUT BRAKE

Model	Length [L]	Outer diameter of sheath	Minimum bending radius	Weight
R88A-CA1G003SF	3 m	8.8 mm dia.	88 mm	0.8 kg approx.
R88A-CA1G005SF	5 m			1.2 kg approx.
R88A-CA1G010SF	10 m			2.1 kg approx.
R88A-CA1G015SF	15 m			3.0 kg approx.
R88A-CA1G020SF	20 m			4.0 kg approx.

Life specification: 10 million operation with minimum bending radius.



\*1. Connect the cable to the servo drive enclosure using the shield clamp.

\*2. PE and shell are set in the connectors at Servo motor's side.

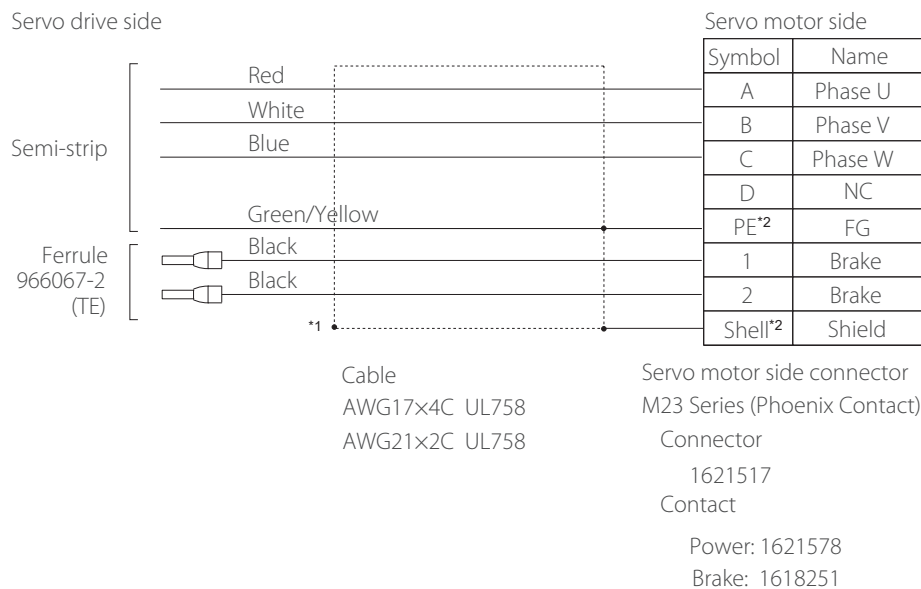
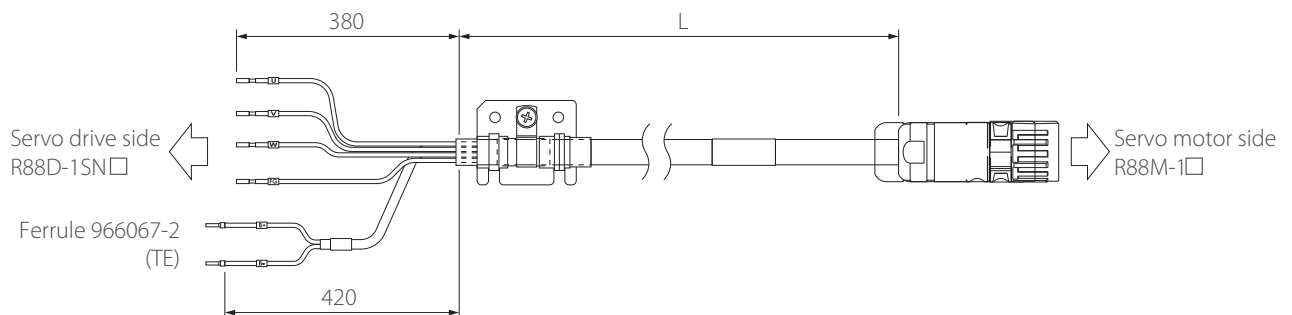
# Using R88A-CA1G power cables

## Technical Note

### SPECIFICATIONS / POWER CABLE WITH BRAKE

Model	Length [L]	Outer diameter of sheath	Minimum bending radius	Weight
R88A-CA1G003BF	3 m	12.5 mm dia.	125 mm	1.0 kg approx.
R88A-CA1G005BF	5 m			1.4 kg approx.
R88A-CA1G010BF	10 m			2.3 kg approx.
R88A-CA1G015BF	15 m			3.2 kg approx.
R88A-CA1G020BF	20 m			4.2 kg approx.

Life specification: 10 million operation with minimum bending radius.



\*1. Connect the cable to the servo drive enclosure using the shield clamp.

\*2. PE and shell are set in the connectors at Servo motor's side.

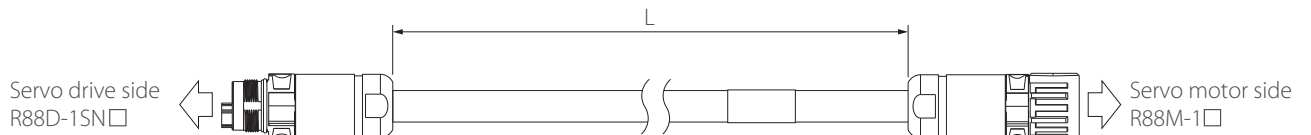
# Using R88A-CA1G power cables

## Technical Note

### SPECIFICATIONS / EXTENSION CABLE

Model	Length [L]	Outer diameter of sheath	Minimum bending radius	Weight
R88A-CA1GE010BF	10 m	12.5 mm dia.	125 mm	2.1 kg approx.
R88A-CA1GE020BF	20 m			4.0 kg approx.

Life specification: 10 million operation with minimum bending radius.



Servo drive side

Name	Symbol
Phase U	A
Phase V	B
Phase W	C
NC	D
FG	PE*1
Brake	1
Brake	2
Shield	Shell*1

Servo drive side connector  
M23 Series (Phoenix Contact)  
Connector  
1621549  
Contact  
Power: 1621581  
Brake: 1618256

Servo motor side

Symbol	Name
A	Phase U
B	Phase V
C	Phase W
D	NC
PE*1	FG
1	Brake
2	Brake
Shell*1	Shield

Servo motor side connector  
M23 Series (Phoenix Contact)  
Connector  
1621517  
Contact  
Power: 1621578  
Brake: 1618251

Cable  
AWG17×4C UL758  
AWG21×2C UL758

\*1. PE and shell are set in the connectors at Servo motor's side.