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Instruction Manual

Linear Servo Amplifier

Model :

AMLS-※-※-※-10

———To use this product correctly and safely:———

- Before using the product, read this instruction manual carefully.
- Follow the instructions and safety precautions mentioned in this instruction manual.
- Keep this instruction manual carefully in a safe and easy accessible place so that the future reference can be made immediately when necessary.
- This manual should be incorporated with the manuals for each hydraulic system using this product.

YUKEN KOGYO CO., LTD.

About This Manual



- Some drawings in this instruction manual, being abstracted, may not necessarily represent the actual products or component parts. In some cases, an abstract drawing is used to show the products or component parts.
 - The contents of this manual are subject to change without notice.
 - This instruction manual has been produced with our best knowledge and attention. However, if you have a question or find an error or omission, please contact your YUKEN KOGYO sales representative or our Sales Department.
 - If the instruction manual in your hand has missing or out-of-order pages, contact your YUKEN KOGYO sales representative or our Sales Department for a replacement.
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■ SAFETY PRECAUTIONS

- This instruction manual assumes the reader and user has basic knowledge of hydraulics and electricity.
- The product must be handled directly by or under the guidance of persons having basic knowledge of hydraulics and electricity.
- The instructions and safety precautions (defined below) in this manual must be made known to the end users of the product.
- When you sell or transfer this product, please be sure to provide this instruction manual along with the product.

In this instruction manual, safety precautions are classified into two ranks: **WARNING**, and **CAUTION**.

These words are defined as follows:

	WARNING: Indicates a potential danger that may cause death or severe injury unless you observe this description.
	CAUTION: Indicates a potential danger that may cause a minor or moderate injury or that may result in property damage.

Note that even precautions labeled "CAUTION" may cause serious harm. Since all precautions are important regardless of their rank, be sure to follow all of them.

YUKEN KOGYO assumes no liability for any accident causing death, injury, or property damage caused by the unauthorized use or handling of the product or information contained herein.

 **WARNING**

■ Installation

- Always disconnect the power supply before installing or moving this product or connecting cables.
Failure to do so may result in electric shock, fire, or death.
- Do not use in a place of high humidity as this may result in fire or electric shock.
- Always attach an earth wire to prevent electric shocks in the event of an electrical fault.
- Never attach the earth wire to any of the following locations:
 - Gas pipe
 - Dedicated telephone earth
 - Lightning rod
 - Water pipe or faucet

■ In the event of a fault

- If smoke is emitted
Continuing to use the product when it is in a faulty condition such as emitting smoke or an unusual smell may result in fire or electric shock.
Disconnect the power supply immediately, check that the smoke is no longer being emitted, then call your service agent.
Do not attempt to repair the product yourself as this is dangerous.
- In the event of physical damage
If the product is dropped or knocked over, disconnect the power supply immediately and contact your service agent.
Continuing to use the product may result in fire or electric shock.
- In the event of water entering the product
If water gets inside the product, disconnect the power supply immediately and contact your service agent.
Continuing to use the product may result in fire or electric shock.

■ Prohibitions

- Modification of the product is prohibited
Do not modify the product.
Modification may cause fire, electric shock, or injury.
- Disassembly of the product is prohibited
Do not disassemble the product.
Disassembly may damage the product or result in electric shock.
- Use in a wet environment is prohibited
Do not allow water to enter the product or use the product where it can become wet.
Water may damage the product or cause fire or electric shock.

 **CAUTION**

■ Installation location**● Do not locate near a flame**

Do not place the product or its associated cables near heaters or other heat-emitting equipment.

Locating near a flame may cause damage such as deterioration of the cable sheath or melting the terminals, resulting in fire or electric shock.

● Do not locate in areas where the product may be subject to high temperature

Do not locate the product or cables in areas of high temperature or in areas receiving direct sunlight.

Locating the product in such areas may result in a rise in the internal temperature of the product leading to fire or fault.

● Do not locate in areas where the product may be subject to oil splash or steam

Do not locate the product in dusty environments or in locations where hydraulic fluid or steam may be released.

Locating the product in such positions may cause fire, electric shock, or fault.

● Do not locate in an unstable position

Do not locate the product in an unstable position such as at an angle or on an unstable base. Instead, attach to a secure position in a control panel.

Similarly, do not place heavy objects on top of the product.

This may result in the object falling and causing injury.

■ Prohibitions**● Do not stand, sit or lean on the unit.**

This may result in a fall or break causing damage or injury.

● Do not touch

Do not touch the terminals while the product is in use.

This may cause a short circuit or other problem resulting in damage or misoperation.

● Do not hit

Do not hit the product.

This may damage the product.

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Introduction

This product is an amplifier dedicated to linear servo valves manufactured by YUKEN KOGYO. The amplifier must be used in combination with applicable valves specified by their external drawings.

Product Check

Be sure to check the following items when the product arrives.

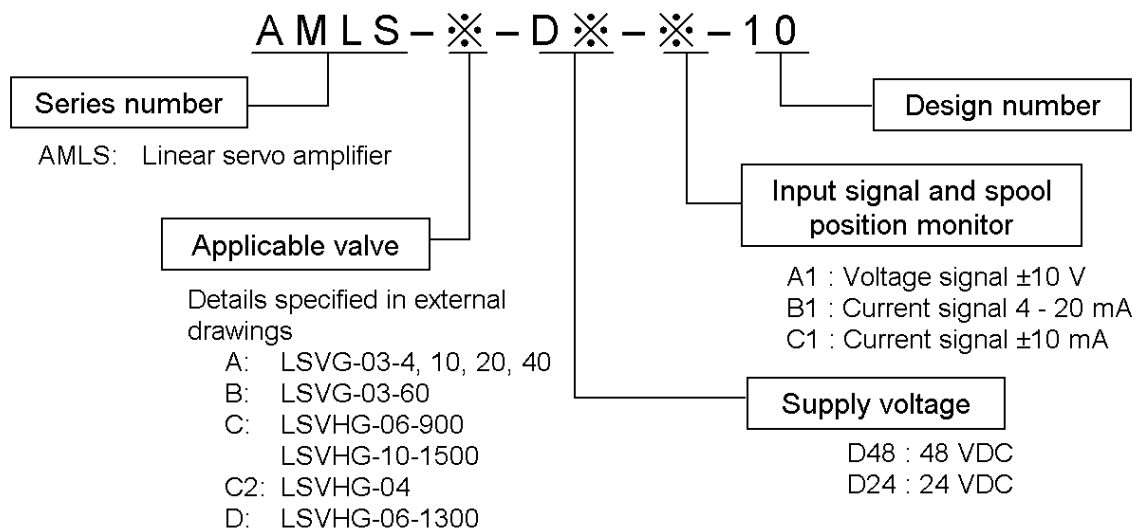
In the event you have any questions regarding malfunctions, etc., contact the dealer where you purchased the product or your local YUKEN KOGYO sales representative.

- Check whether the product is the right one you ordered.
Check the product with the model number stamped on the nameplate.
- Check for absence of any accessory.
Accessories: Fuse (5 A) × 1 [SB-5 from Nagasawa Electric Works, Ltd.]
- Check if the product has any damage, loose screws, or any other problem.

1. Overview

In response to the input command signals and the position sensor outputs from the linear servo valve spool, this amplifier outputs currents to the linear motor to determine the valve spool position, thereby controlling the linear servo valve.

1.1 Product Model Number



1.2 Specifications

● Specifications for 48 VDC Models

Item		AMLS-A/B-D48-A1-10	AMLS-C/C2/D-D48-A1-10
Power supply		48 VDC $\pm 5\%$ 2 A (4 A peak)	
Rated output current		± 2 A continuous (± 4 A peak)	
Sensor monitor signal output	SM.L-to-COM voltage	<ul style="list-style-type: none"> Outputs the linear servo valve spool position. Outputs ± 10 V to attain the rated displacement (\pm) of the valve. 	<ul style="list-style-type: none"> Outputs the pilot valve spool position. Outputs ± 10 V to attain the rated displacement (\pm) of the valve.
	SM.M-to-COM voltage	Not used	<ul style="list-style-type: none"> Output the main valve spool position. Outputs ± 10 V to attain the rated displacement (\pm) of the valve.
	Load resistance	10 k Ω or more	
Rated input voltage		± 10 V	
Max. input voltage		± 11 V	

Item		AMLS-A/B-D48-B1-10	AMLS-C/C2/D-D48-B1-10
Power supply		48 VDC $\pm 5\%$ 2 A (4 A peak)	
Rated output current		± 2 A continuous (± 4 A peak)	
Sensor monitor signal output	SM.L-to-COM voltage	<ul style="list-style-type: none"> Outputs the linear servo valve spool position. Outputs +4 to +20 mA to attain the rated displacement (\pm) of the valve. 	<ul style="list-style-type: none"> Outputs the pilot valve spool position. Outputs +4 to +20 mA to attain the rated displacement (\pm) of the valve.
	SM.M-to-COM voltage	Not used	<ul style="list-style-type: none"> Outputs the main valve spool position. Outputs +4 to +20 mA to attain the rated displacement (\pm) of the valve.
	Load resistance	100 to 500 Ω	
Rated input current		+4 to +20 mA	
Max. input current		+2.4 to +21.6 mA	

Item		AMLS-A/B-D48-C1-10	AMLS-C/C2/D-D48-C1-10
Power supply		48 VDC $\pm 5\%$ 2 A (4 A peak)	
Rated output current		± 2 A continuous (± 4 A peak)	
Sensor monitor signal output	SM.L-to-COM voltage	<ul style="list-style-type: none"> Outputs the linear servo valve spool position. Outputs ± 10 mA to attain the rated displacement (\pm) of the valve. 	<ul style="list-style-type: none"> Outputs the pilot valve spool position. Outputs ± 10 mA to attain the rated displacement (\pm) of the valve.
	SM.M-to-COM voltage	Not used	<ul style="list-style-type: none"> Outputs the main valve spool position. Outputs ± 10 mA to attain the rated displacement (\pm) of the valve.
	Load resistance	100 to 500 Ω	
Rated input current		± 10 mA	
Max. input current		± 11 mA	

● Specifications for 24 VDC Models

Item		AMLS-A/B-D24-A1-10	AMLS-C/C2/D-D24-A1-10
Power supply		24 VDC $\pm 5\%$ 3 A (4 A peak)	
Rated output current		± 2 A continuous (± 3 A peak)	
Sensor monitor signal output	SM.L-to-COM voltage	<ul style="list-style-type: none"> Outputs the linear servo valve spool position. Outputs ± 10 V against the rated displacement (\pm) of the valve. 	<ul style="list-style-type: none"> Outputs the pilot valve spool position. Outputs ± 10 V against the rated displacement (\pm) of the valve.
	SM.M-to-COM voltage	Not used	<ul style="list-style-type: none"> Output the main valve spool position. Outputs ± 10 V against the rated displacement (\pm) of the valve.
	Load resistance	10 k Ω or more	
Rated input voltage		± 10 V	
Max. input voltage		± 11 V	

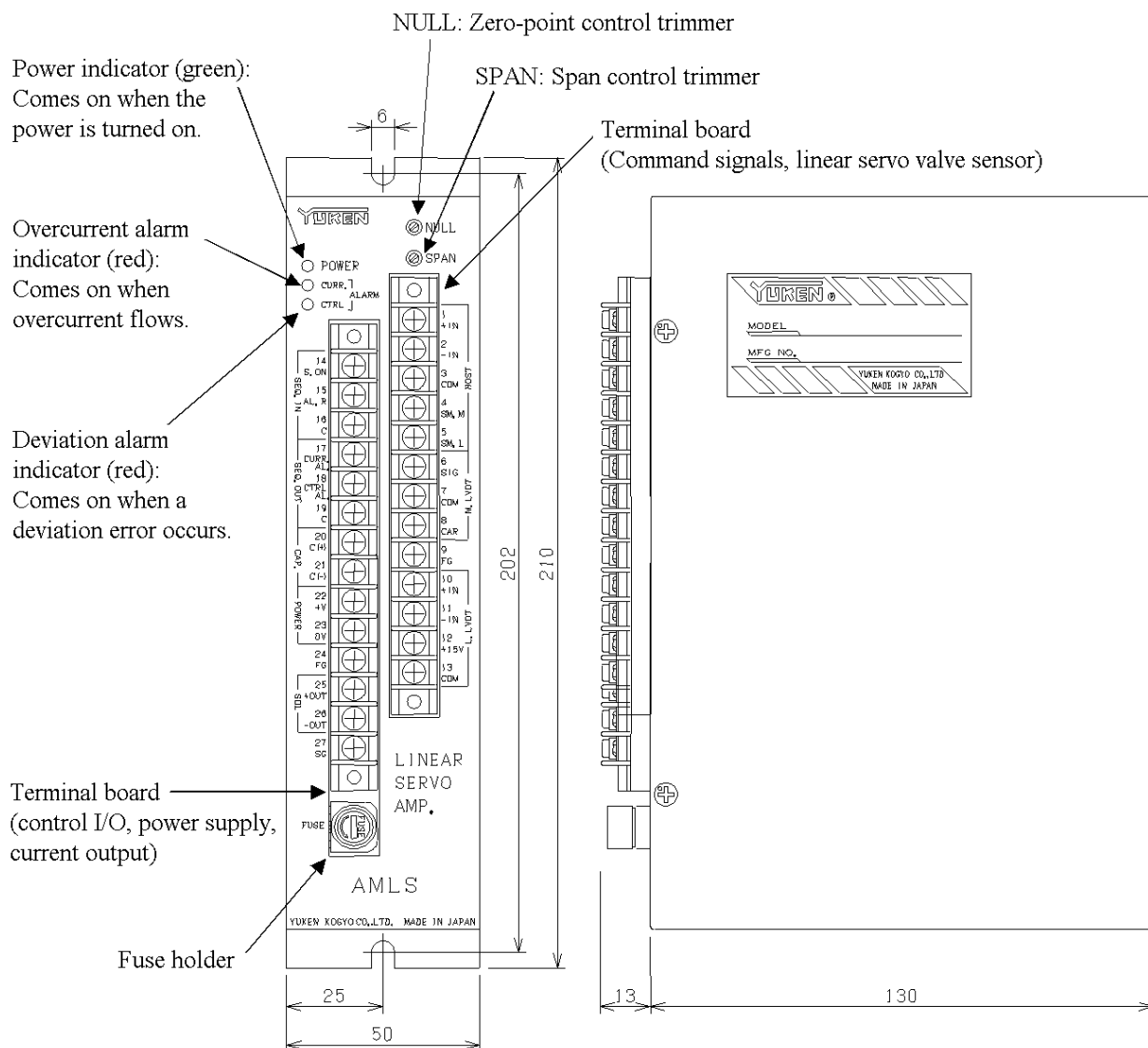
Item		AMLS-A/B-D24-B1-10	AMLS-C/C2/D-D24-B1-10
Power supply		24 VDC $\pm 5\%$ 3 A (4 A peak)	
Rated output current		± 2 A continuous (± 3 A peak)	
Sensor monitor signal output	SM.L-to-COM voltage	<ul style="list-style-type: none"> Outputs the linear servo valve spool position. Outputs +4 to +20 mA against the rated displacement (\pm) of the valve. 	<ul style="list-style-type: none"> Outputs the pilot valve spool position. Outputs +4 to +20 mA against the rated displacement (\pm) of the valve.
	SM.M-to-COM voltage	Not used	<ul style="list-style-type: none"> Outputs the main valve spool position. Outputs +4 to +20 mA against the rated displacement (\pm) of the valve.
	Load resistance	100 to 500 Ω	
Rated input current		+4 to +20 mA	
Max. input current		+2.4 to +21.6 mA	

Item		AMLS-A/B-D24-C1-10	AMLS-C/C2/D-D24-C1-10
Power supply		24 VDC $\pm 5\%$ 3 A (4 A peak)	
Rated output current		± 2 A continuous (± 3 A peak)	
Sensor monitor signal output	SM.L-to-COM voltage	<ul style="list-style-type: none"> Outputs the linear servo valve spool position. Outputs ± 10 mA against the rated displacement (\pm) of the valve. 	<ul style="list-style-type: none"> Outputs the pilot valve spool position. Outputs ± 10 mA against the rated displacement (\pm) of the valve.
	SM.M-to-COM voltage	Not used	<ul style="list-style-type: none"> Outputs the main valve spool position. Outputs ± 10 mA against the rated displacement (\pm) of the valve.
	Load resistance	100 to 500 Ω	
Rated input current		± 10 mA	
Max. input current		± 11 mA	

● Other specifications (for all models)

Item	Specifications
Max. in-phase input voltage	±6 V
Control signal input (Servo On signal, Alarm reset signal)	Photocoupler input Input current regulating resistor: 2.2 kΩ Operating voltage: +15 to 28 VDC
Alarm output (Overcurrent alarm, Deviation error alarm)	Photocoupler output Voltage: 50 VDC max. Current: 30 mA max.
Ambient temperature	0 to 50 °C
Ambient humidity	20 to 90% Rh (Dew condensation is not allowed)
Mass	Approx. 1.8 kg

1.3 External Dimensions and Face Panel



2. Power Amplifier Wiring

2.1 Notes on Installation

⚠ WARNING

- ◆ Before installing, moving, or connecting a cable to the power amplifier, be sure to turn off the power supply.
Failure to do this results in an electric shock, fire, amplifier malfunction or fault.
- ◆ Use the power amplifier always at the specified supply voltage. Operating the amplifier at an invalid voltage causes a fire or electric shock.

⚠ CAUTION

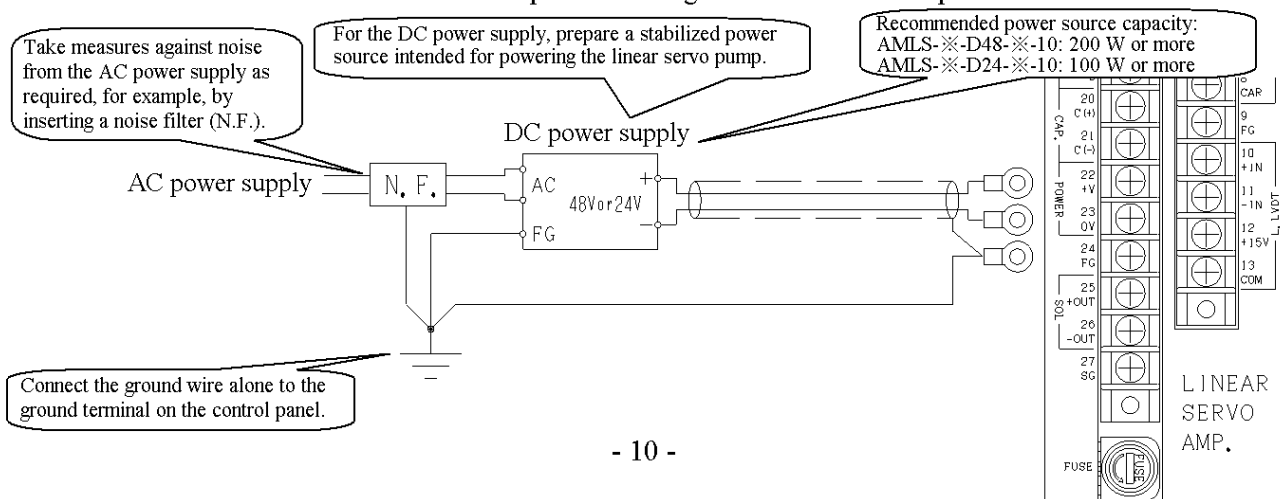
- ◆ The amplifier must be installed at a stable position, for example, in the control panel. Install the amplifier in a well-ventilated place where it is not exposed to much dust or vibration. Do not install it in a place subject to high temperature or high humidity, or the amplifier may cause a malfunction or fault.
- ◆ Although the amplifier accepts a line voltage variation within $\pm 5\%$, an excessive surge voltage may cause the amplifier to malfunction.
If this is the case, take appropriate measures against noise, for example, by inserting a noise filter on the power supply side.
- ◆ Prepare a DC power supply dedicated to the amplifier.
- ◆ The power source (AC power supply) for the DC power supply must not be shared with other devices generating much noise (such as solenoid operated directional valves, heaters, or motors).
- ◆ If the amplifier is installed in the control panel containing a high-noise device such as an inverter, separate its power filter and ground wire from those for the amplifier.

2.2 Connection Methods

2.2.1 Connecting the power supply and the ground wire

Use shielded cable for wiring between the amplifier and the power supply.

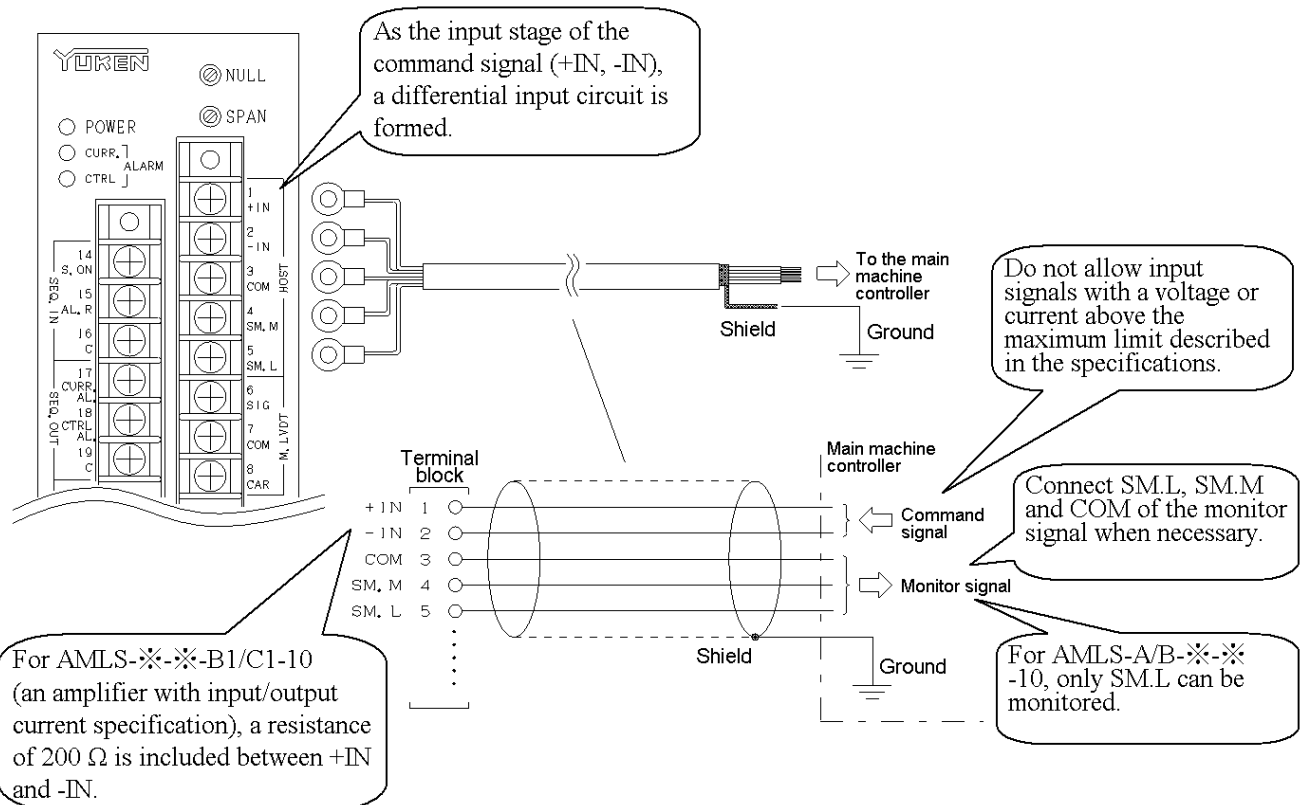
- Power source cable, ground cable: Twisted cable, cross section 0.75 mm^2 (AWG19) to 1.25 mm^2 (AWG16)
- Shield the power source cable to ground.
- Connect the FG terminal of the amplifier to the ground of the control panel.



2.2.2 Command signal and monitor signal connection

Use shielded cable to connect the command signal and the monitor signal.

- Twisted cable, cross section 0.3 mm² (AWG22) to 1.25 mm² (AWG16)
- Shield the cable at the main machine side.
- The model of AMLS-※-※-A1-10 is supplied with the voltage input/output specifications, while AMLS-※-※-B1/C1-10 is with the current input/output specifications.

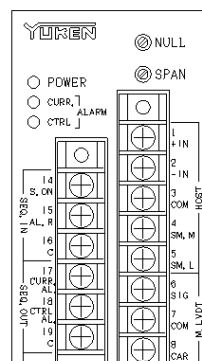
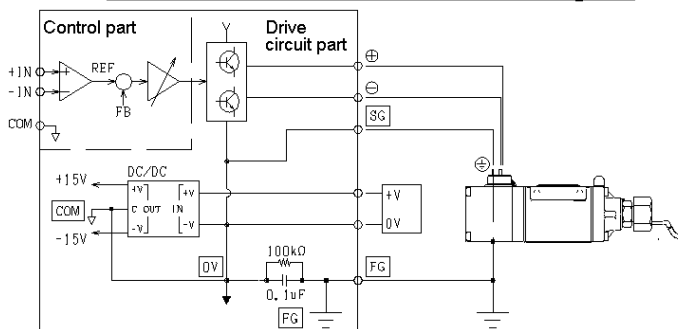


⚠ WARNING

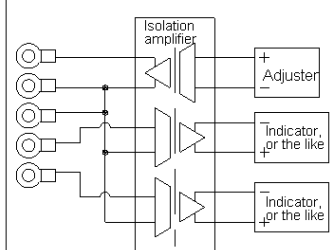
- ◆ The COM of the monitor signal (pin 3) is not insulated from the 0 V power source (pin 23). When connecting to a valve, the COM of the monitor signal is connected in common with the 0 V power source (pin 23), the FG (pin 24, the housing), and the valve body (ground).

For equipment to connect to the linear servo amplifier, leave the COM (pin 3) idle or use an isolation amplifier between the equipment and the linear servo pump if you do not wish to connect the COM and the 0 V line of the equipment in common with ground.

COM, 0V, FG internal connection diagram



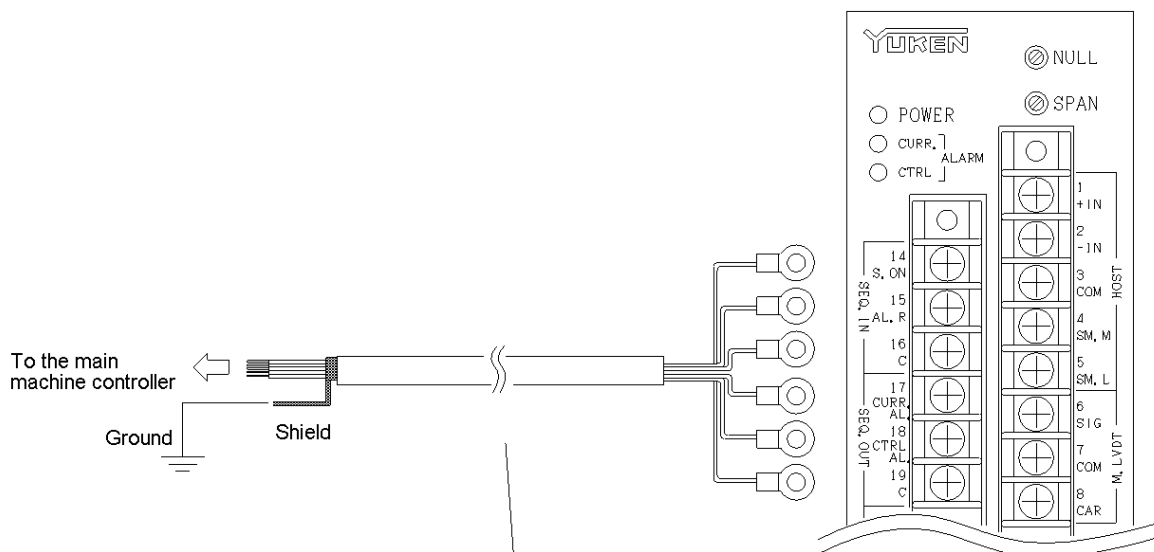
Use example of isolation amplifier



2.2.3 Control input/output signal connection

Use shielded cable to connect the command input signal (servo ON and alarm reset) and the control output signal (overcurrent and abnormal difference alarm).

- Twisted cable, cross section 0.3 mm² (AWG22) to 1.25 mm² (AWG16)
- Shield the cable at the main machine side.

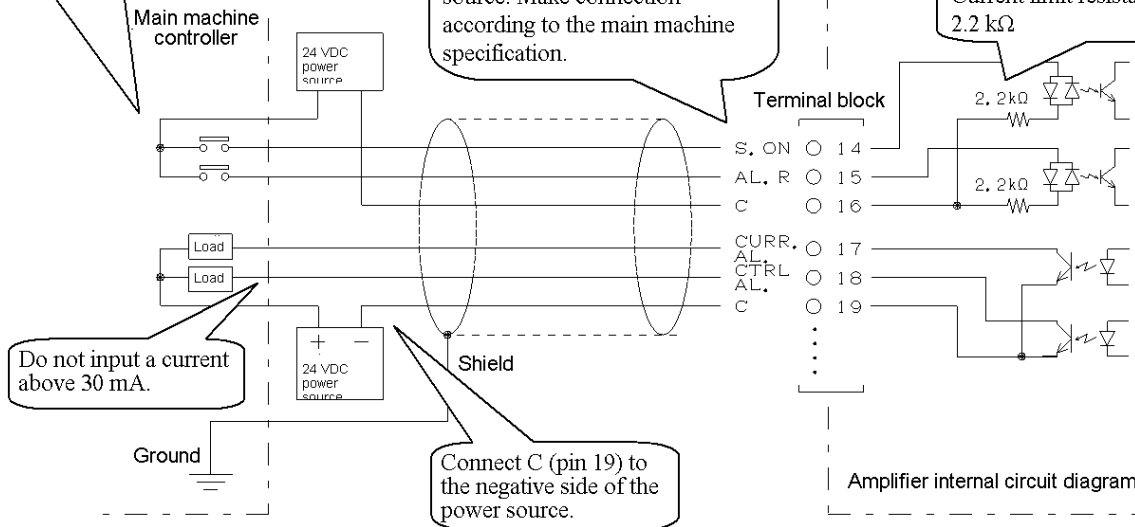


To avoid malfunction, each signal current must be:
 when ON: 3 mA or more
 when OFF: 0.2 mA or less

S, ON, AL and R can be connected to either of the positive and negative sides of the power source. Make connection according to the main machine specification.

Control input specifications
 Photo coupler input (AC input type)
 Current limit resistance for input: 2.2 kΩ
 Operating voltage: +15 to 28 VDC

Current limit resistance for input: 2.2 kΩ



Do not input a current above 30 mA.

Connect C (pin 19) to the negative side of the power source.

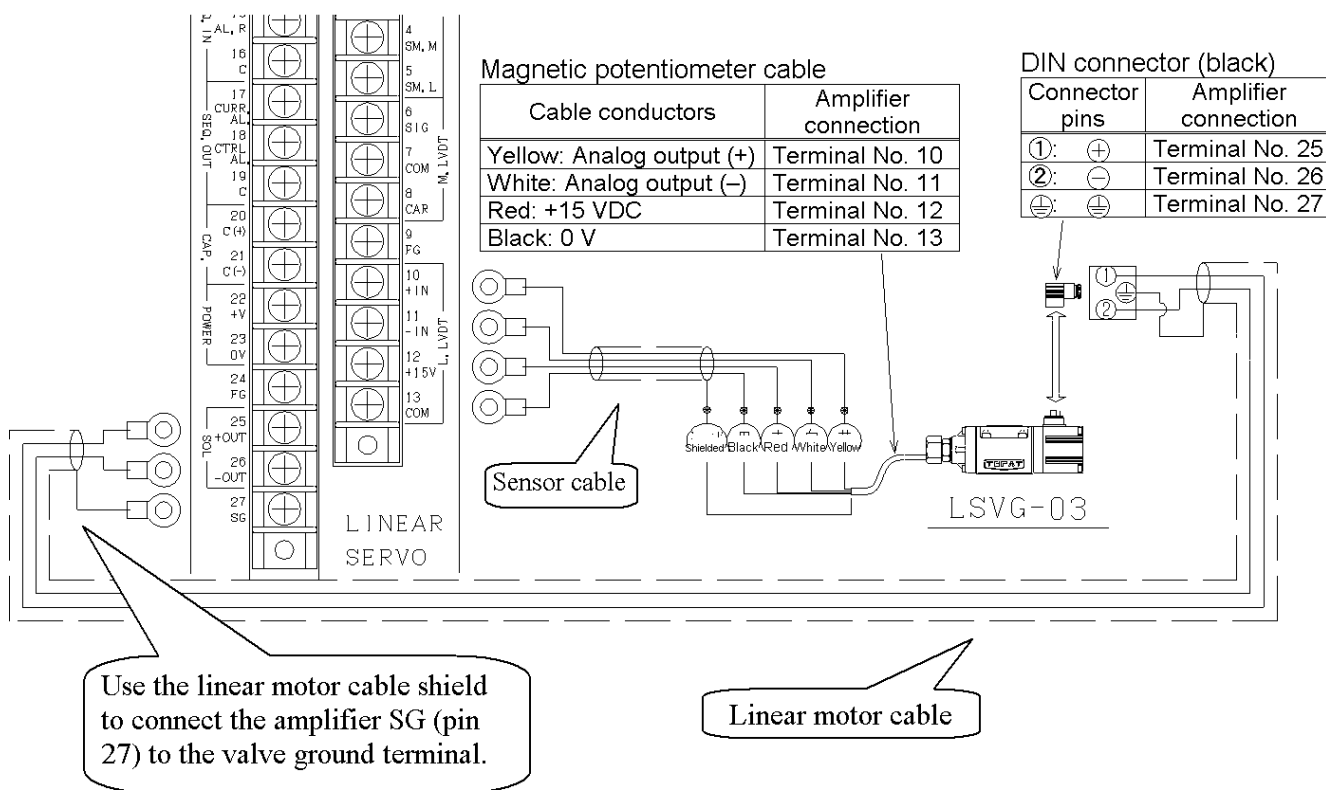
Amplifier internal circuit diagram

2.2.4 Connecting the amplifier to the linear servo valve

1) Model number AMLS-A/B-※-※-10

Make connections between the amplifier terminal block (L. LVDT) and the magnetic potentiometer (the linear servo valve sensor), and between the amplifier terminal block (SOL.) and the linear motor.

- Use shielded cable for each connection.
- Sensor cable: Twisted cable, cross section 0.5 mm² (AWG20) to 0.75 mm² (AWG19)
- Linear motor cable: Twisted cable, cross section 0.75 mm² (AWG19) to 1.25 mm² (AWG16)
- The wiring length of each cable may not exceed 20 m except when a valve for long distance is used in combination.



⚠ WARNING

- ◆ Make wiring separate from the power line of the motor or the like.
- ◆ Be sure to make wiring of the sensor (the magnetic potentiometer) cable and the linear motor cable separately.
- ◆ Do not make wiring by merging the cables into the same multi-conductor cable. Doing so may lead to a malfunction of the valve or oscillation.

2) Model number AMLS-C/C2/D-※-※-10

Make connections between the amplifier terminal block (L. LVDT) and the magnetic potentiometer (the linear servo valve sensor), the amplifier terminal block (M. LVDT) and the main valve, and between the amplifier terminal block (SOL.) and the linear motor.

- Use shield cable for each connection.
- Pilot valve sensor cable:
Twisted cable, cross section 0.5 mm² (AWG20) to 0.75 mm² (AWG19)
- Main valve sensor cable:
Twisted cable, cross section 0.5 mm² (AWG20) to 0.75 mm² (AWG19)
- Linear motor cable: Twisted cable, cross section 0.75 mm² (AWG19) to 1.25 mm² (AWG16)
- The wiring length of each cable may not exceed 20 m except when a valve for long distance is used in combination.

Connect the shield to the amplifier COM (pin 7) if the impact of noise is too strong.

Use the linear motor cable shield to connect the amplifier SG (pin 27) to the valve ground terminal.

Linear motor cable

Pilot valve sensor cable

Main valve sensor cable

DIN connector (black)

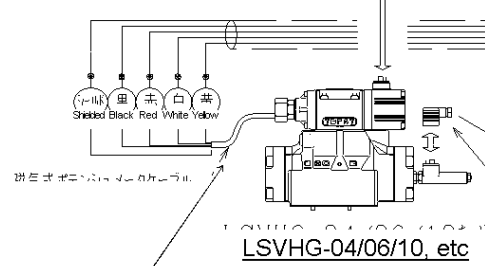
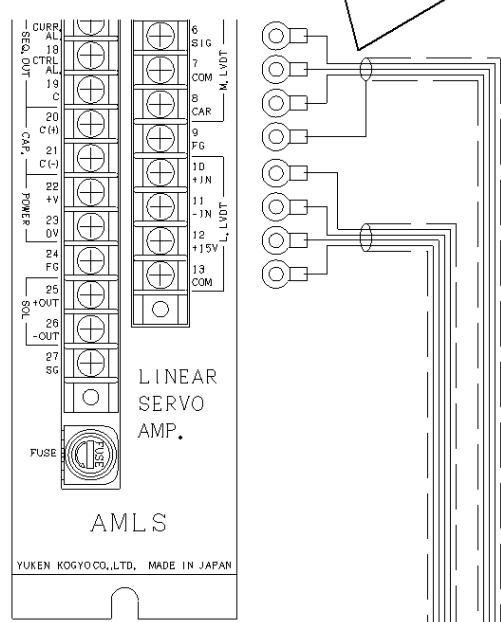
Connector pins	Amplifier connection
①: +	Terminal No. 25
②: -	Terminal No. 26
③: ⊕	Terminal No. 27

DIN connector

Connector pins for LVDT	Amplifier connection
①: SIG	Terminal No. 6
③: COM	Terminal No. 7
②: CAR	Terminal No. 8

Magnetic potentiometer cable

Cable conductors	Amplifier connection
Yellow: Analog output (+)	Terminal No. 10
White: Analog output (-)	Terminal No. 11
Red: +15 VDC	Terminal No. 12
Black: 0 V	Terminal No. 13



⚠ WARNING

- ◆ Make wiring separate from the power line of the motor or the like.
- ◆ Be sure to make wiring of the linear motor cable, the pilot valve sensor cable (for the potentiometer), and the main valve sensor cable separately.
- ◆ Do not make wiring by merging the cables into the same multi-conductor cable. Doing so may lead to a malfunction of the valve or oscillation.

2.3 Notes on Wiring

2.3.1 Cables

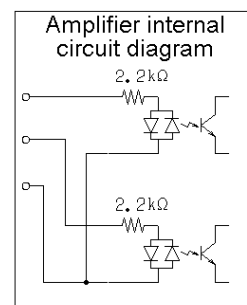
- Do not make wiring by merging the linear motor cable and other cables into the same multi-conductor cable. Doing so may lead to a malfunction of the valve or oscillation.
- Be sure to make wiring of the linear motor cable, the pilot valve cable (for the magnetic potentiometer), and the main valve sensor cable separately.
- The wiring length of each cable may not exceed 20 m.
- Make wiring separate from the power line of the motor or the like.

2.3.2 DC power supply

- For model number AMLS-※-D48-※-10, use a DC power source of 200 W or more that is intended for powering an amplifier, and if the model is AMLS-※-D24-※-10 the DC power source must be 100 W or more.
- For DC power supply, prepare a power supply dedicated to the amplifier.
- Where two or more linear servo amplifiers are used at one time, provide DC power source connection on a per amplifier basis.

2.3.3 Control input signals

- The photocoupler is an AC input type.
- The signal-common terminal (terminal No. 16) can serve either for + common or – common power supply. Refer to the specifications for details.



3. Functions

WARNING

- ◆ Be sure to turn on the power of the amplifier before turning on the hydraulic system or equipment. Failure to do so may result in abnormal system behavior.

(Safety Precautions)

This product is not designed or manufactured for use in equipment that could be used in life-critical conditions.

Even though this product is manufactured under strict quality controls, fit your equipment with safety devices when using this product in equipment where the product failure could result in a serious accident or loss.

Depending on the fault conditions of the amplifier's internal circuit, an abnormal current may be output and an inoperable state may occur.

3.1 Control Input Signals

- Servo ON signal: When the servo ON signal is ON, a coil current is output to control the spool displacement of the linear servo valve. The alarm output signal is not masked even when the servo ON signal is OFF.
- Alarm reset signal: When an overcurrent alarm occurs, the alarm output can be reset by turning on this signal. (Min. reset width: 1 ms)
However, the alarm will recur if the cause of overcurrent is not removed.

3.2 Alarm output signals

- Overcurrent alarm output signal

<For model number AMLS-※-D48-※-10>

- This signal is output when a current flow of approx. 2.5 A or more is continued for 3 minutes or longer, or when a current flow of approx. 4 A or more is continued for 0.1 second or longer.
- The overcurrent alarm indicator lights up in red at the same time.

<For model number AMLS-※-D24-※-10>

- This signal is output when a current flow of approx. 2.5 A or more is continued for 3 minutes or longer, or when a current flow of approx. 3 A or more is continued for 0.1 second or longer.
- The overcurrent alarm indicator lights up in red at the same time.

When an overcurrent alarm output signal is output, the overcurrent alarm indicator lights up in red and the linear servo amplifier **shuts off the coil current**.

Remove the cause of overcurrent and then input the alarm reset signal or turn on the power to **reset the alarm**. **Otherwise, the valve spool can not be controlled.**

- Differential alarm output signal

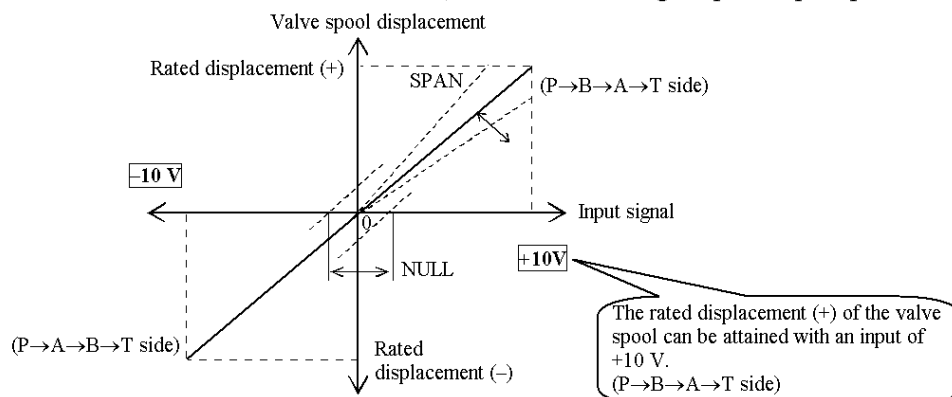
This signal is output when, due to no input of servo ON signal, cable miswiring, no pilot pressure, etc., the valve spool displacement fails to work as controlled by the command signal and as a result **deviates from the command signal** (i.e., abnormal differential). The differential alarm indicator lights up in red at the same time.

Even though the differential alarm is output, **the coil current is not shut off**. The alarm will be **automatically cleared** when the cause of abnormal differential is removed. If the alarm remains activated, check if the cable is correctly wired and if the servo ON signal is input.

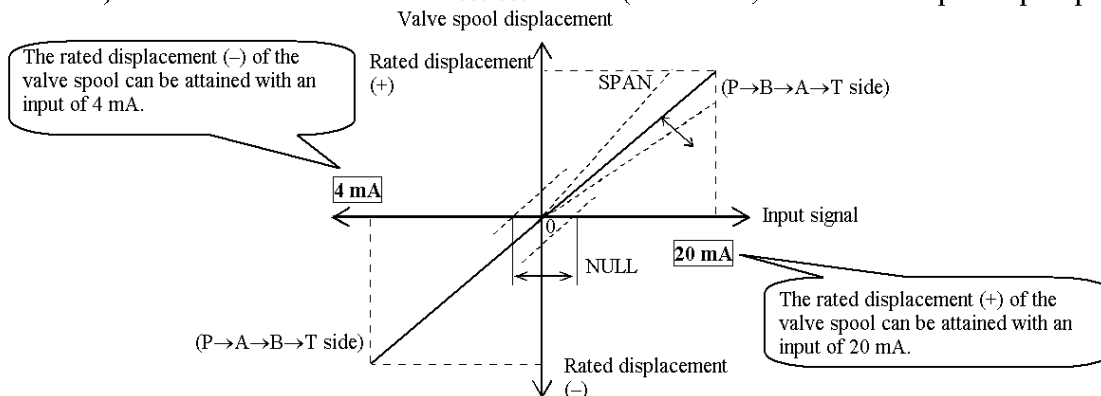
3.3 Relationship between Command Signal Input and Valve Spool Displacement

The relation of the signal to be input to the input signal terminals (1 and 2) and the controlled valve spool displacement varies depending on the amplifier model used.

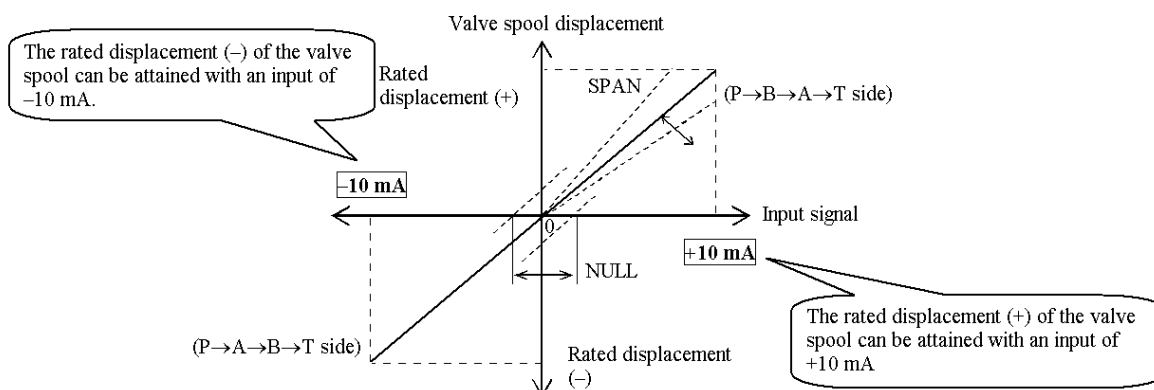
- 1) For model number AMLS-※-※-A1-10 (± 10 V, with voltage input/output specifications)



- 2) For model number AMLS-※-※-B1-10 (4 - 20 mA, with current input/output specifications)



- 3) For model number AMLS-※-※-C1-10 (± 10 mA, with current input/output specifications)



⚠ CAUTION

- ◆ Though NULL and SPAN of the amplifier is factory-adjusted, the rated valve displacement (the valve flow rate) may deviate depending on the wiring length of the sensor cable and the adjustment variation within specifications. When such a case arises, make adjustment using the NULL and SPAN volumes on the panel surface.

3.4 Detection of Supply Voltage Drop

When the power source voltage falls below approx. 37 V (AMLS-※-D48-※-10) or below 20 V (AMLS-※-D24-※-10), a signal is forcibly input to attain the neutral displacement of the valve spool.

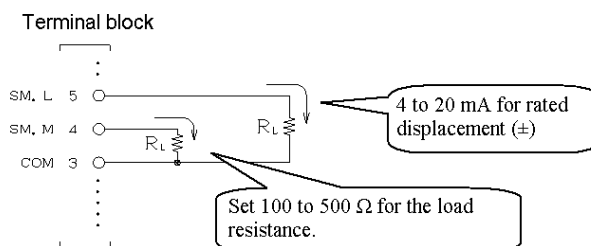
Meanwhile, any external input signals will be ignored.

The external input signals will become effective when the power source voltage restores.

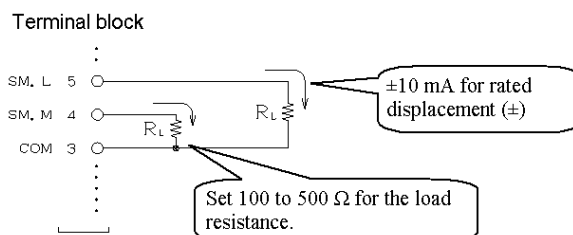
3.5 Monitor Output

The spool position of the valve can be monitored by measuring the voltages between terminals No. 5 (SM.L) and No. 3 (COM) and between terminals No. 4 (SM.M) and No. 3 (COM) on the amplifier terminal board.

- Between SM.L and COM: Output of the spool position of linear servo valve (pilot valve)
 - Between SM.M and COM: Output of the spool position of main valve
(Monitor is available for models other than AMLS-A/B-※-※-10.)
- 1) For model number AMLS-※-※-A1-10 (± 10 V, with voltage input/output specifications)
 - Monitor is available by measuring the voltage between SM.L and COM or that between SM.M and COM.
 - Conversion: ± 10 V for the rated displacement (+)
 - 2) For model number AMLS-※-※-B1-10 (4 - 20 mA, with current input/output specifications)
 - Monitor is available by measuring the current between SM.L and COM or that between SM.M and COM.
 - Conversion: 4 mA to 20 mA for the rated displacement (\pm)



- 3) For model number AMLS-※-※-C1-10 (± 10 mA, with current input/output specifications)
 - Monitor is available by measuring the current between SM.L and COM or that between SM.M and COM.
 - Conversion: ± 10 mA for the rated displacement (\pm)



⚠ WARNING

- ◆ The COM of the monitor signal (pin 3) is not insulated from the 0 V power source (pin 23). When connecting to a valve, the COM of the monitor signal (pin 3) is connected in common with the 0 V power source (pin 23), the FG (pin 24, the housing), and the valve body (ground).

4. Troubleshooting

If the amplifier behaves abnormally, follow the checking procedure below:

1) The power indicator lamp (green) is off.

- Check the supply voltage. → If no voltage has been applied, check the power supply side.
- Check the fuse on the amplifier. → Check if the fuse has blown.

2) The overcurrent alarm indicator lamp (red) is on.

- Check the resistance of the pilot valve linear motor. → Remove the DIN connector and check the resistance between pin 1 and pin 2. (Approx. 4.5 Ω when normal)
- Check the wiring. → Check if all cables are correctly connected.

3) The valve spool displacement (monitor output) remains unchanged in response to the command signal input.

- Check the command signal input. → Check the monitor output of the command signal
- Check the wiring. → Check if all cables are correctly connected.
- Check the pilot pressure. → Check if the pilot pressure is supplied. (Except AMLS-A/B-※-※-10)

4) Strange noise is heard.

- Check ground connection. → Check if the earth cable of the power source connector is correctly connected.
- Check the wiring. → Check if the amplifier SG (pin 27) is correctly connected to the ground of the valve. Check if the cable is correctly shielded.

5. Storage of the Amplifier

Unused amplifiers reserved as spares or replacements must be stored and managed appropriately in a dedicated location.

To prevent rusting and corroding, avoid the following locations:

- Places subject to high temperature, high humidity, and freeze
- Places to be exposed to the weather
- Places either near chemicals such as organic solvents, acids, and alkalis or subject to the fumes of gases.
- Places with large variations in temperature, possibly causing condensation

6. Disposal

When disposing of this amplifier, treat it as a general industrial waste.

7. Service Information

If you have any requests relating to YUKEN products or require service, contact the dealer from whom you purchased the product, your local YUKEN sales representative, or the department listed below.

- **YUKEN KOGYO CO., LTD.**

International Business Department (Tokyo office):

Hamamatsucho Seiwa Bldg., 4-8, 1-chome, Shiba-Daimon
Minato-ku, Tokyo, 105-0012, Japan

Tel: 81-3-3432-2110

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