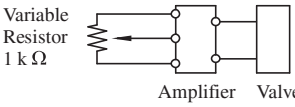
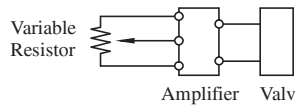


Power Amplifiers / Setting Adjusters For Proportional Electro-Hydraulic Control Valves

These are power amplifiers to be used exclusively to operate the electro-hydraulic proportional valves. Various type and models are available for a variety of applications.

Type	Model Numbers	Applicable to Control Valve	Function
DC Input	AME-D-10-*-20	Pressure or Flow Control (For 10 Ω Sol.)	By giving the command of DC voltage (0–10 V) to the amplifier, current in proportion to that voltage will flow into the solenoid of the control valve in order to control pressure or flow rate. An external setting unit which makes the command voltage of 0–10 V and a DC power supply (or a function generator) are necessary, but if a variable resistor for external setting is only one, the internal power supply for amplifier can be used. 
	AME-D-40-*-40	Flow Control (For 40 Ω Sol.)	
	AME-D2-H1-*-12	Flow Control and Relief (For 40 Ω –10 Ω Sol.)	
	AME-D2-1010-*-11	Flow Control and Relief (For 10 Ω –10 Ω Sol.)	
DC Input-Feedback	SK1022-*-*-11	Pressure or Flow Control (For 10 Ω Sol.)	Basically, this is a DC input type with a feedback operating unit. This is for high-accuracy control and used to feedback the pressure or flow rate converted to electric signals.
	AME-DF-S-*-22	Flow Control (For 40 Ω Sol.)	
Slow Up-Down	AME-T-S-*-22	Flow Control (For 40 Ω Sol.)	A slow up-down signal generator and the functions of a DC input type are incorporated. This is used to control the pressure or flow rate by slow up-down pattern and the command signals are given by relay contacts, limit switches, timer contacts, etc.
DC Input For DC Power 24 V DC	SK1015-11 AMN-D-10 AMN-W-10	Pressure or Flow Control (For 10 Ω Sol.)	An amplifier which is operated by a battery power supply (24 V). By giving the command of DC voltage to the amplifier, current in proportion to that voltage will flow into the solenoid of the control valve in order to control pressure or flow rate. An external setting unit which makes the command voltage and a DC power supply (or a function generator) are necessary, but if a variable resistor for external setting is only one, the internal power supply for amplifier can be used. 
	SK1091-D24-10	Directional and Flow Control	
DC Input with Minor Feedback	AMN-L-01-*-*-10	High Response Type Directional and Flow Control	An amplifier which is operated by a battery power supply (24V). This is for high-response, high-accuracy control and used to feedback the pressure or flow rate converted to electric signals.
	AMB-EL-*-*-*-10		
Shockless	AMN-G-10	Shockless Directional and Flow Control	Outputs shockless patterns, low speed (Level 1) high-speed (Level 2) low speed (Level 3). Shockless speed control is enabled just by providing SOL a and SOL b only contact signals in the same control mode as the mode for the “G” series of shifting time adjustable type shockless valves.

Instructions

- The power amplifiers should be kept away from hot and humid conditions which may deteriorate some components of the power amplifiers. They also should be installed in the clean and dry place where the vibration is minimal. Please avoid to install the power amplifiers in the complete enclosure or get them enclosed totally as they need to radiate the heat from semiconductors or ICs inside.
- Please use shielded wires for input signal transmission to prevent the amplifiers from any interference such as noise from outside.

Power Amplifiers For 10Ω Series Control Valves

These power amplifiers are used to drive the 10Ω series proportional electro-hydraulic pressure or flow control valves.

Model Number Designation

AME	-D	-10	-100	-20
Series Number	Type of Function	Coil Resistance of Valve	Power Supply	Design Number
AME	D: DC Input Type	10: 10 Ω	100: 100 V AC 200: 200 V AC	20

SK1022	-A	-100	-11
Series Number	Type of Function	Power Supply	Design Number
SK1022: DC Input-Feedback Type	A: Polarity of Feedback Voltage...(-) B: Polarity of Feedback Voltage...(+)	100: 100 V AC 200: 200/220 V AC	11
SK1015: DC Input Type for DC Power Supply	—	—★	11

★ Use with 24 V DC since this is for a battery power supply.

Specifications

Model No.	AME-D-10-*-20	SK1022-A-*-11	SK1022-B-*-11	SK1015-11
Description				
Type of Function	DC Input Type	DC Input Feedback Type	DC Input Feedback Type	DC Input Type
Max. Output Current	1 A (10 Ω Solenoid)	1 A (10 Ω Solenoid)	1 A (10 Ω Solenoid)	0.9 A (10 Ω Solenoid)
Max. Input Voltage	+ 10 V DC	+ 10 V DC	+ 10 V DC	+ 10 V DC
Feedback Voltage	—	0 to -10V	0 to +10V	—
Input Impedance	10 kΩ	50 kΩ	50 kΩ	50 kΩ
Max. Gain	1 A / 5 V	1 A / 0.5 V	1 A / 0.5 V	0.9 A / 5 V
Dither	Variable	Fix	Fix	Fix
Temperature Drift (Max.)	0.2 mA /°C	0.2 mA /°C	0.2 mA /°C	1 mA /°C
Power Supply	100 V AC, 200 V AC (50/60 Hz)★	100 V AC, 200/220 V AC ±10% (50/60 Hz)		22-30 V DC
Power Input (Max.)	55 VA	45 VA	45 VA	25 VA
Ambient Temperature	0-50°C (32-122°F)	0-50°C (32-122°F)	0-50°C (32-122°F)	0-50°C (32-122°F)
External Setting Resistance	1 kΩ	1 kΩ	1 kΩ	10 kΩ
Mass	2.1 kg (4.6 lbs.)	4.5 kg (9.9 lbs.)	4.5 kg (9.9 lbs.)	0.4 kg (.88 lbs.)

★ Serviceable Range; 100 VAC can be used from 90 to 132 VAC, 200 VAC can be used from 180 to 264 VAC.

Instructions

Power supply for the setting adjuster can be provided from this power amplifier, but for only one. However, please use the variable resistor or potentiometre of which impedance is 1 kΩ (in case of madel SK1015, use 10 kΩ) for the setting adjuster.

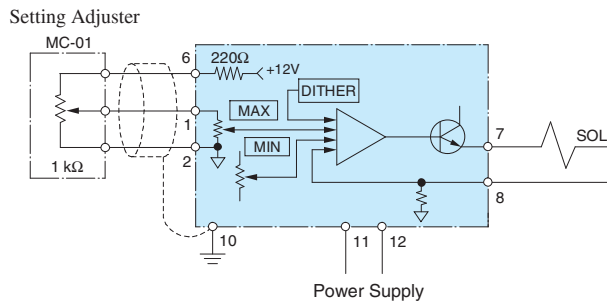


Applicable to Valve

Name of Valve	Model Numbers
Pilot Relief Valves	EDG-01*
Relief Valves	EBG-03 EBG-06 EBG-10
Relieving and Reducing Valves	ERBG-06 ERBG-10
10 Ω Series Flow Control Valves	EFG-03/06 EFCG-03/06 (51 Design)
Flow Control and Relief Valves	EFBG-03 EFBG-06 EFBG-10

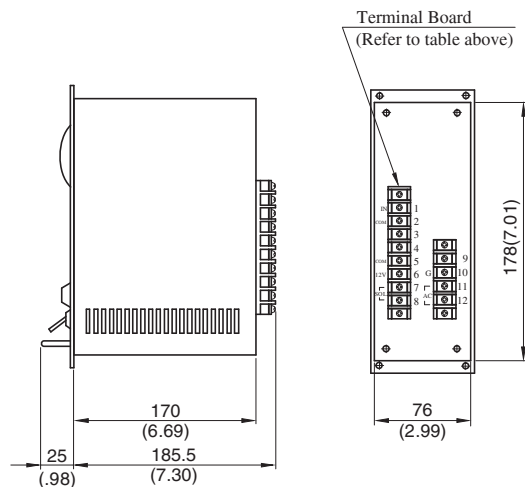
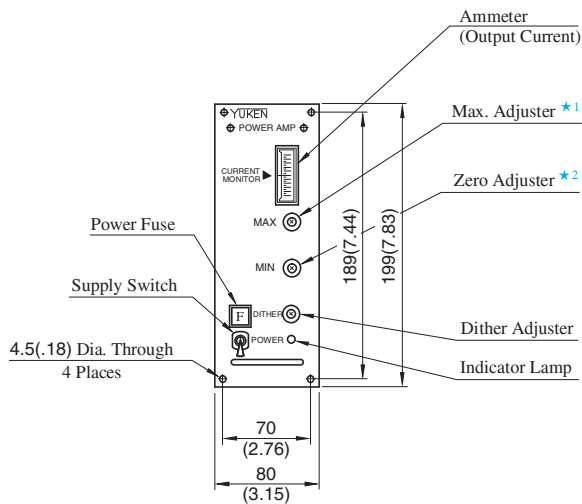
AME-D-10-* -20

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name
1	Input Signal IN
2	Input Signal COM
3	—
4	—
5	Input Signal COM
6	Internal Power Supply +12 V
7	Output to Valve SOL
8	Solenoid SOL
9	—
10	Ground G
11	Power Supply
12	100/200 VAC

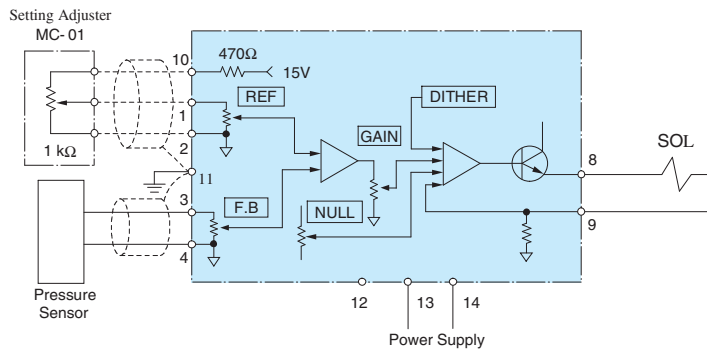


- ★ 1. Adjustment of upper limit of usable range
- ★ 2. Adjustment of lower limit of usable range

DIMENSIONS IN
MILLIMETRES (INCHES)

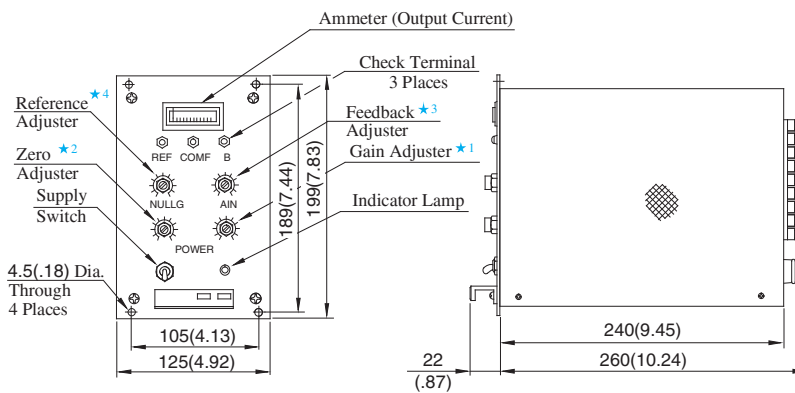
SK1022-A
B-*11

[Example Diagram]

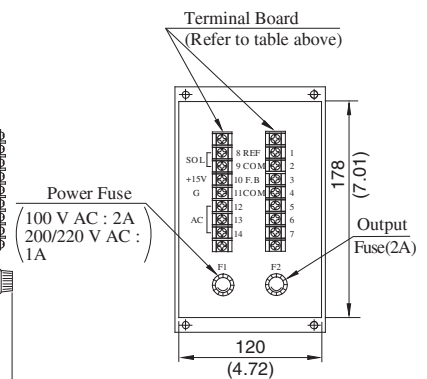


● Detail of Terminal Board

Terminal Number	Name
1	Input Signal REF
2	Input Signal COM
3	Feedback Signal F.B
4	Feedback Signal COM
5	—
6	—
7	—
8	Output to Valve Solenoid SOL
9	SOL
10	Power Supply for Setting Adjuster +15V (10 V at 1 kΩ)
11	Ground G
12	Power Supply 100 V AC, 200V AC : 13, 14 220 V AC : 12, 14
13	
14	



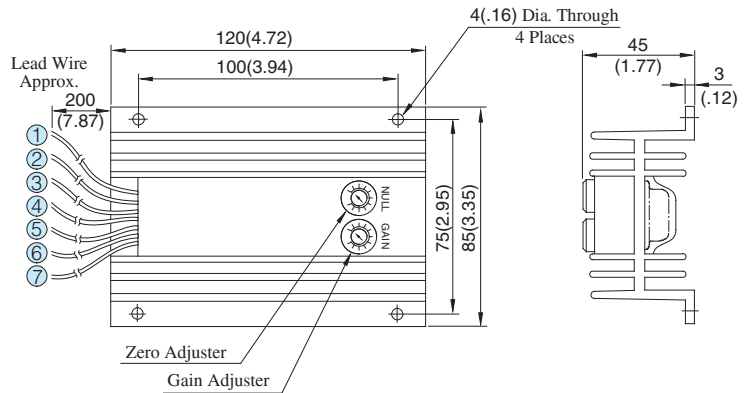
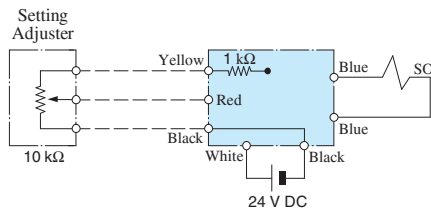
- ★1. Adjustment of upper limit of usable range
- ★2. Adjustment of lower limit of usable range
- ★3. Adjustment of feedback voltage ratio
- ★4. Adjustment of input voltage ratio



**DIMENSIONS IN
MILLIMETRES (INCHES)**

SK1015-11

[Example Diagram]



● Lead Wire Detail

- ① White.....Plus of 24 V DC
- ② Black.....Zero of 24 V DC
- ③ Blue..... } Output to Valve Solenoid
- ④ Blue..... }
- ⑤ Yellow.....15 V Power Supply for Setting Adjuster (10 V at 10 kΩ)
- ⑥ Red.....Input Signal
- ⑦ Black.....Zero of Input Signal

DIMENSIONS IN
MILLIMETRES (INCHES)

■ Instructions

● Supply Switch

The power amplifier has no power supply switch.

As soon as it is connected to a power supply, it comes to be alive. Provide a power switch externally.

■ Compact Power Amplifiers For 10Ω Series Control Valves

Compact power amplifiers for 10Ω proportional solenoids. The power supply is 24 V DC. It uses a new circuitry to be slow to heat.

■ Model Number Designation

AMN	-D	-10
Series Number	Type of Function	Design Number
AMN	D : DC Input Type	10



■ Specifications

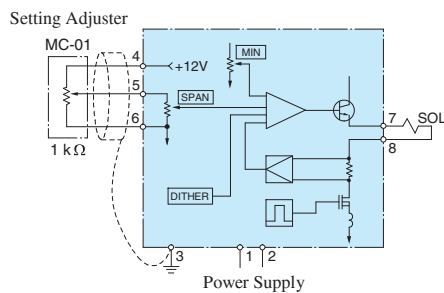
Model No.	AMN-D-10
Description	
Type of Function	DC Input Type
Max. Output Current	1 A (10 Ω Solenoid)
Power Input (Max.)	+ 10 V DC
Input Impedance	10 kΩ
Max. Gain	1 A / 5 V
Dither	Variable
Temperature Drift (Max.)	0.2 mA / °C
Power Supply	24 V DC (20 - 30 V DC)
Max. Input Power	25 W
Ambient Temperature	0 - 50°C (32 - 122°F)
External Setting Resistance	1 kΩ
Approx. Mass	0.2 kg (.44 lbs.)

■ Applicable to Valve

Name of Valve	Model Numbers
Pilot Relief Valves	EDG-01*
Relief Valves	EBG-03 EBG-06 EBG-10
Relieving and Reducing Valves	ERBG-06 ERBG-10
10 Ω Series Flow Control Valves	EFG-03/06 EFCG-03/06 (51 Design)
10 Ω-10 Ω Series High Flow Series Flow Control and Relief Valves	EFBG-03 EFBG-06 EFBG-10

AMN-D-10

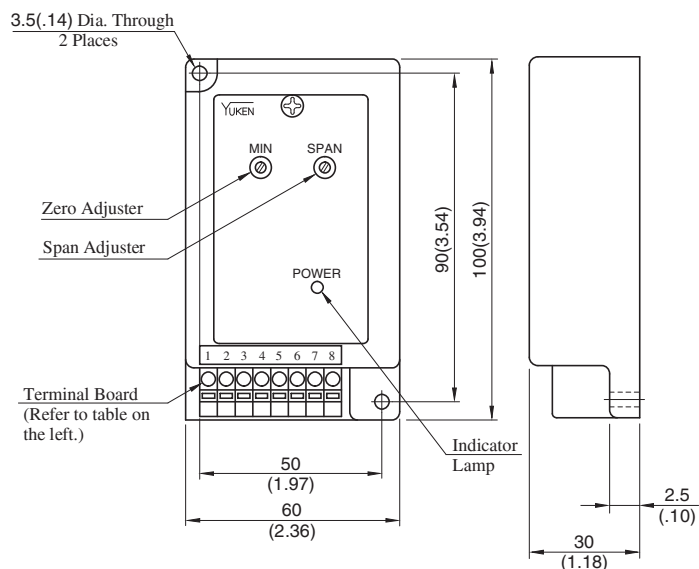
[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name	
1	Power Supply	+24 V
2	Power Supply	0 V
3	Ground	G
4	Internal Power Supply	+12 V
5	Input Signal	IN
6	Input Signal	COM
7	Output to Valve Solenoid	
8		SOL

DIMENSIONS IN MILLIMETRES (INCHES)



■ Power Amplifiers For 40Ω Series Flow Control Valves

These power amplifiers are used to drive the 40Ω series proportional electro-hydraulic flow control valves.

■ Model Number Designation

AME	-D	-40	-100	-40
Series Number	Type of Function	Coil Resistance of Valve	Power Supply	Design Number
AME	D: DC Input Type	40 : 40 Ω	100 : 100 V AC 200 : 200 V AC	40

AME	-DF	-S	-100	-22
Series Number	Type of Function	Type of Mounting	Power Supply	Design Number
AME	DF: DC Input Feedback Type	S: Panel Mounting Type	100 : 100 V AC	22
	T: Slow Up Down Type		200 : 200/220 V AC	22



■ Applicable to Valve

Name of Valve	Model Numbers
40 Ω Series Flow Control Valves	EFG -02 (31 Design) EFCG
	EFG -03 (26 Design) EFCG
	EFG -06 (22 Design) EFCG
	EFG -10 (11 Design) EFCG

■ Specifications

Model No.	AME-D-40-*-40	AME-DF-S-*-22	AME-T-S-*-22
Description			
Type of Function	DC Input Type	DC Input Feedback Type	Slow Up Down Type
Max. Output Current	0.8 A (40 Ω Solenoid)	0.8 A (40 Ω Solenoid)	0.8 A (40 Ω Solenoid)
Max. Input Voltage	+ 10 V DC	+ 10 V DC	—
Feedback Voltage	—	0 to -10 V	—
Input Impedance	10 kΩ	50 kΩ	—
Slow Up Down Range	—	—	0.05 – 1 s/100 mA
Max. Gain	0.8 A / 5 V	0.8 A / 5 V	—
Dither	Fix	Fix	Fix
Temperature Drift (Max.)	0.2 mA /°C	0.2 mA /°C	0.2 mA /°C
Power Supply	100 V AC, 200/220 V AC ±10% (50/60 Hz)		
Power Input (Max.)	70 VA	90 VA	90 VA
Ambient Temperature	0–50°C (32–122°F)	0 – 50°C (32 – 122°F)	0 – 50°C (32 – 122°F)
External Setting Resistance	1 kΩ	1 kΩ	—
Approx. Mass	2.8 kg (6.2 lbs.)	4.5 kg (9.9 lbs.)	4.5 kg (9.9 lbs.)

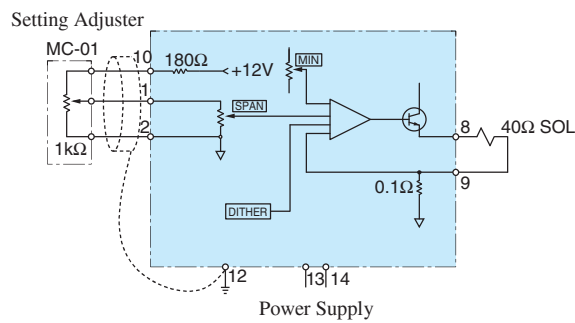
■ Instructions

● Power supply of the outside setting adjuster

When DC input type (AME-D-40) or DC input-feedback type (AME-DF-S) power amplifier is used, power supply for the setting adjuster can be provided from this power amplifier, but for only one. However, please use the variable resistor or potentiometre of which impedance is 1 kΩ for the setting adjuster.

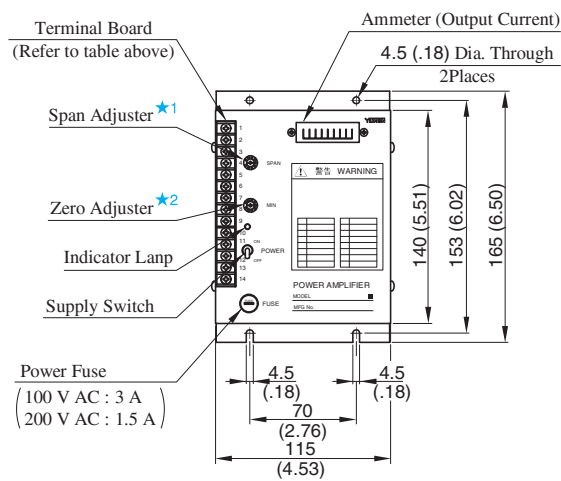
AME-D-40-✱-40

[Example Diagram]

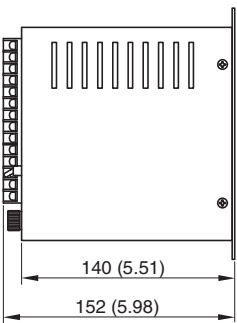


● Detail of Terminal Board

Terminal Number	Name	
1	Input Signal	IN
2	Input Signal	COM
3	—	
4	—	
5	Internal Power Supply	-5V
6	Feedback Signal	MFB
7	Feedback Signal	COM
8	Output to Valve Solenoid	SOL
9	Output to Valve Solenoid	SOL
10	Internal Power Supply	+12V
11	—	
12	Frame Ground	FG
13	Power Supply	VAC
14		VAC



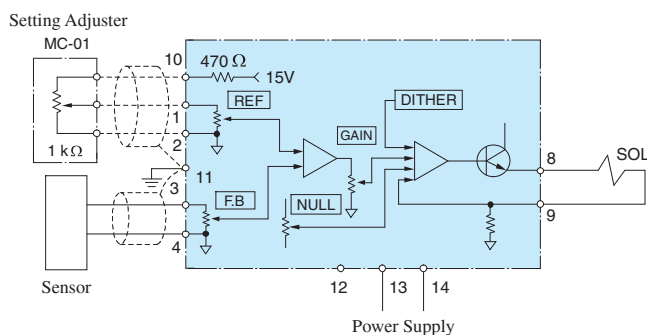
- ★ 1. Adjustment of upper limit of usable range
- ★ 2. Adjustment of lower limit of usable range



DIMENSIONS IN
MILLIMETRES (INCHES)

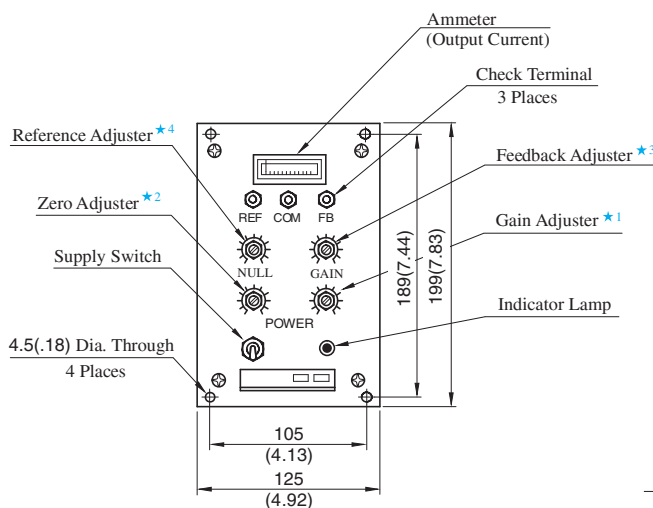
AME-DF-S-※-22

[Example Diagram]



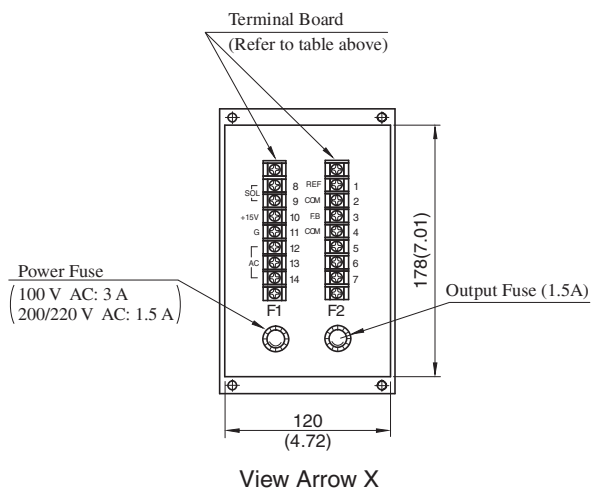
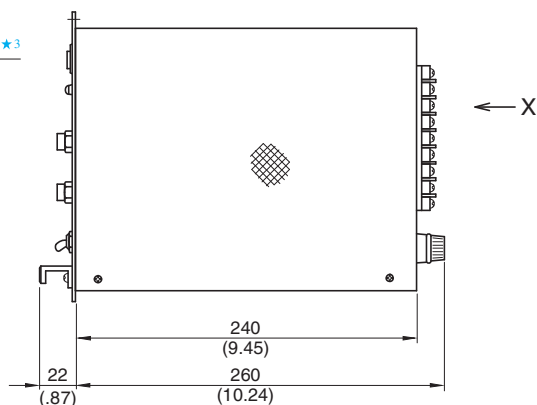
● Detail of Terminal Board

Terminal Number	Name
1	Input Signal REF
2	Input Signal COM
3	Feedback Signal F.B
4	Feedback Signal COM
5	—
6	—
7	—
8	Output to Valve Solenoid SOL
9	—
10	Power Supply for Setting Adjuster (10 V at 1 kΩ) +15 V
11	Ground G
12	Power Supply 100 V AC, 200 V AC: 13, 14 220 V AC: 12, 14
13	
14	



- ★1. Adjustment of upper limit of usable range
- ★2. Adjustment of lower limit of usable range
- ★3. Adjustment of feedback voltage ratio
- ★4. Adjustment of input voltage ratio

DIMENSIONS IN
MILLIMETRES (INCHES)

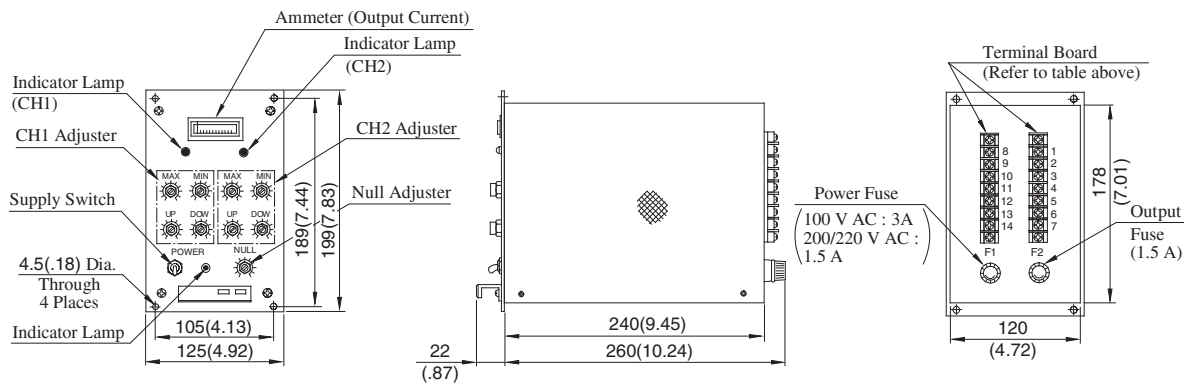
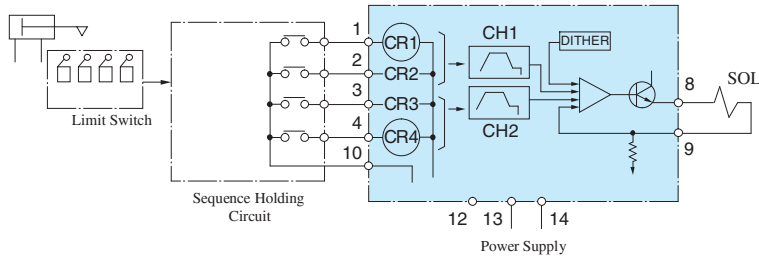


AME-T-S-*-22

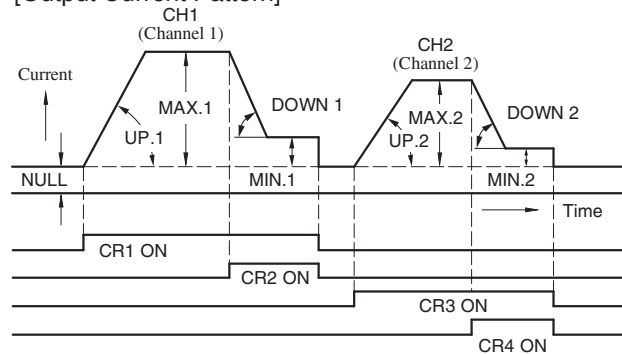
● Detail of Terminal Board

Terminal Number	Name	
1	Input Command	CR1
2	Input Command	CR2
3	Input Command	CR3
4	Input Command	CR4
5	—	
6	—	
7	—	
8	Output to Valve Solenoid SOL	
9		
10	Input Command	CR. COM
11	Ground	G
12	Power Supply 100 V AC, 200 V AC: 13, 14 220 V AC: 12, 14	
13		
14		

[Example Diagram]



[Output Current Pattern]

DIMENSIONS IN
MILLIMETRES (INCHES)

Note: 1. CR1 to CR4: Relays in the power amplifier.

The output patterns CH1 and CH2 can not be obtained simultaneously nor can they be transmitted halfway to another pattern.

2. The words such as MAX, MIN, UP and DOWN show the volume adjustment of the power amplifier.

Terminal
1 & 10 in Short-Circuit
2 & 10 in Short-Circuit
3 & 10 in Short-Circuit
4 & 10 in Short-Circuit

■ How to Calculate Accelerating and Decelerating Time (Example)

Question: Wish to accelerate and decelerate the actuator in between 5 L/min (1.32 U.S. GPM) and 25 L/min (6.6 U.S. GPM) in the use of proportional flow control valve model EFG-02-30-31*.
In such case, what are the manimum and minimum time adjustable for the acceleration and deceleration?

Answer: The input current for EFG-02-30-31* at the flow rate of 5 L/min (1.32 U.S. GPM) and 25 L/min (6.6 U.S. GPM) can be obtained respectively from the chart below. The chart shows:

Input current at 5 L/min (1.32 U.S. GPM) 300 mA

Input current at 25 L/min (6.6 U.S. GPM) 520 mA

Then, the difference between the above two can be obtained with the following formula:

$$520 \text{ mA} - 300 \text{ mA} = 220 \text{ mA}$$

While, the specification for the model AME-T-S shows the amplifier's gradient for acceleration or deceleration as being between 0.05 s/100 mA and 1.0 s/100 mA (which means that the minimum time is 0.05 second and the maximum time is 1.0 second for every 100 mA variation).

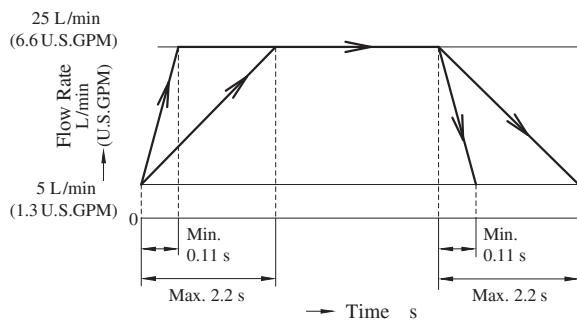
Therefore, the minimum and maximum adjustable time can be obtained as follows:

$$\frac{220 \text{ mA}}{100 \text{ mA}} \times 0.05 \text{ second} = 0.11 \text{ second (Minimum)}$$

$$\frac{220 \text{ mA}}{100 \text{ mA}} \times 1.0 \text{ second} = 2.2 \text{ second (Maximum)}$$

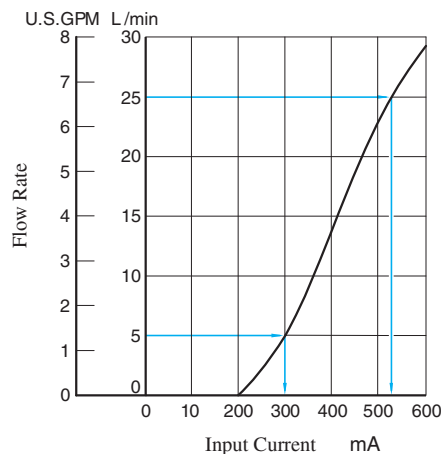
The result above are as illustrated on the below.

[Flow Pattern]



[Input Current vs. Flow]

EFG-02



Interchangeability in Installation Current and New Design

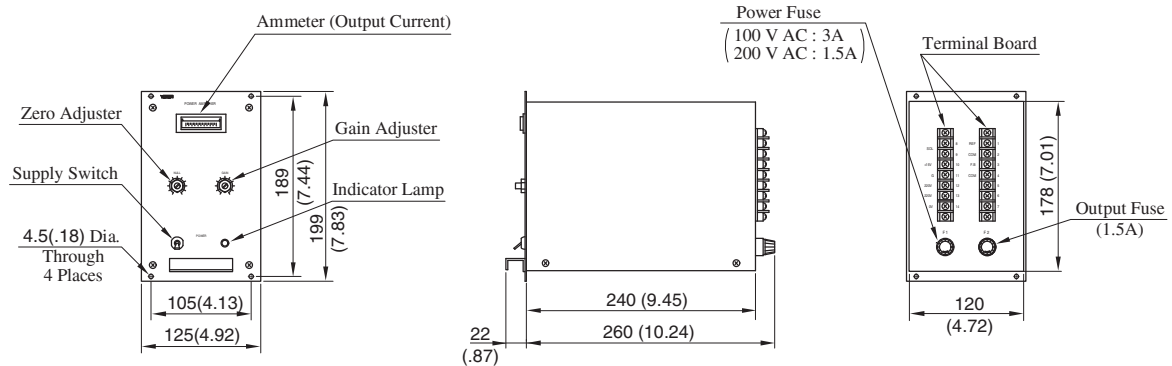
Specification

Electricity consumption is different by Current and New Design.
The other specifications remain unchanged.

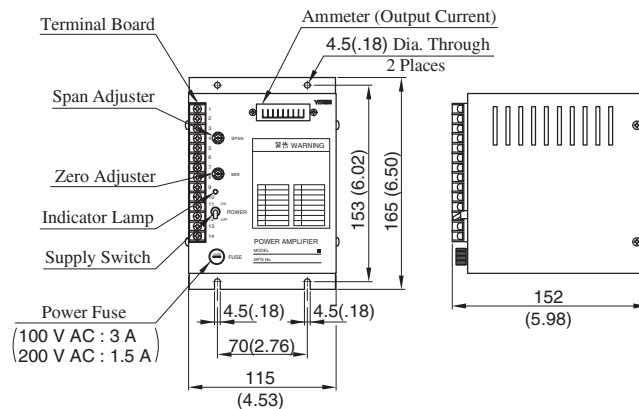
Electricity Consumption	
Current : 32 Design	New : 40 Design
90 VA	70 VA

Installation Interchangeability : None

AME-D-S-* -32



AME-D-40-* -40



DIMENSIONS IN
MILLIMETRES (INCHES)

■ Power Amplifiers For 40Ω - 10Ω Series Control Valves

These power amplifiers are specially designed to combine and incorporate the functions of pressure control (10Ω solenoid) and flow control (40Ω solenoid) into one and can be used for the proportional electro-hydraulic flow control and relief valves of which model numbers are as shown below.



■ Model Number Designation

AME	-D2	-H1	-100	-12
Series Number	Type of Function	Type of Mounting	Power Supply	Design Number
AME	D2: DC Input Type	H1: Wall Tapestry Type	100: 100 V AC 200: 200/220 V AC	12

■ Applicable to Valve

Name of Valve	Model Numbers
40Ω - 10Ω Series Flow Control and Relief Valve	EFBG-03-125-C/H-17* EFBG-06-250-C/H-17* EFBG-10-500-C/H-17*

■ Specifications

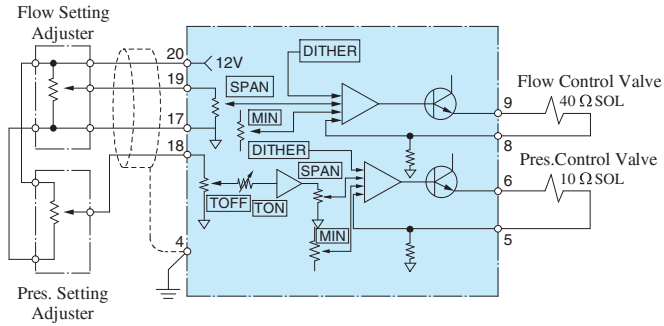
Model No.	AME-D2-H1-*-12	
	Flow Controls (40Ω Solenoid)	Pressure Controls (10Ω Solenoid)
Description	Flow Controls (40Ω Solenoid)	Pressure Controls (10Ω Solenoid)
Type of Function	DC Input Type	DC Input Type
Max. Output Current	0.8 A (40Ω Solenoid)	1 A (10Ω Solenoid)
Max. Input Voltage	+10 V DC	+10 V DC
Input Impedance	10 kΩ	10 kΩ
Max. Gain	0.8 A / 5 V	1 A / 5 V
Dither	Fix	Fix
Temperature Drift (Max.)	0.2 mA / °C	0.2 mA / °C
Power Supply	100 V AC, 200/220 V AC ± 10% (50/60 Hz)	
Power Input (Max.)	130 VA	
Ambient Temperature	0-50°C (32-122°F)	
External Setting Resistance	1 kΩ	1 kΩ
Approx. Mass	5.6 kg (12.3 lbs.)	

■ Instructions

Power supply for the setting adjuster up to two set can be provided from this power amplifier. However, please use the variable resistor or potentiometre of which impedance is 1 kΩ for the setting adjuster.

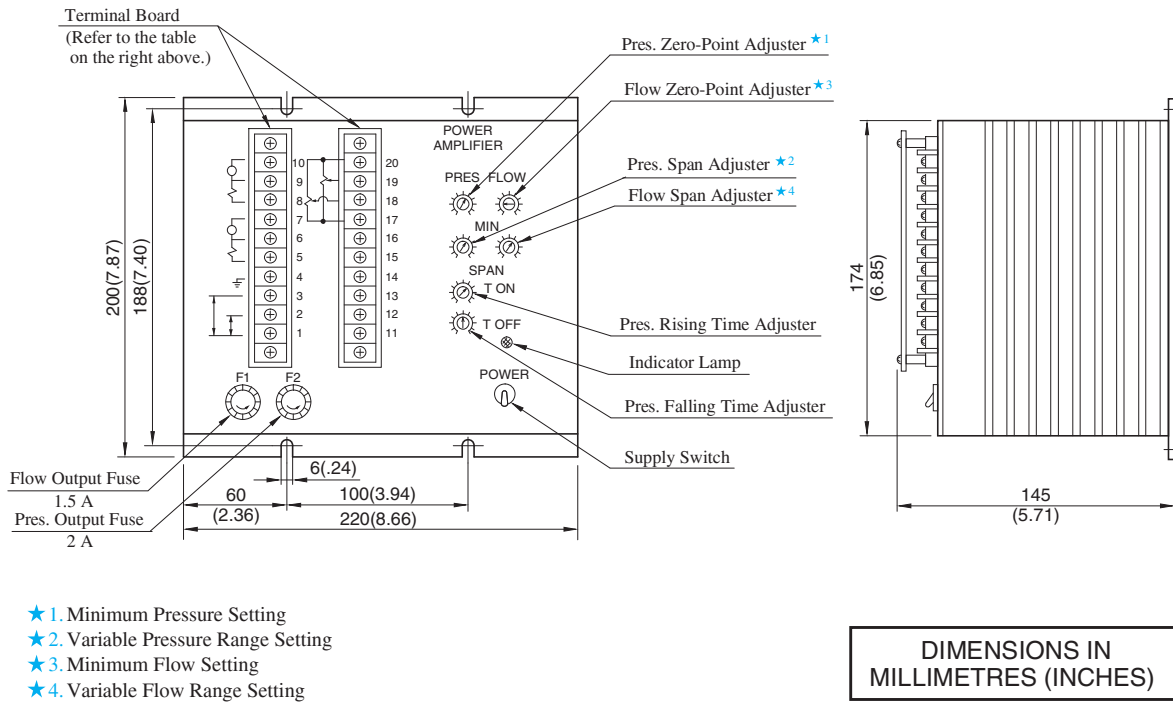
AME-D2-H1-**-12

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name
1	Power Supply 100 V AC, 200 V AC: 1, 2 220 V AC: 1, 3
2	
3	
4	Ground G
5	Output to Pressure Control
6	Valve (10 Ω) Solenoid PR. SOL
7	Ammeter
8	Output to Flow Control
9	Valve (40 Ω) Solenoid FL. SOL
10	Ammeter
11	Common COM
12	—
13	—
14	-12 V OUT -12 V
15	Common COM
16	+12 V OUT +12 V
17	Common COM
18	Input Signal for PRES. PR.IN
19	Input Signal for FLOW FL.IN
20	+12 V OUT +12 V



■ Power Amplifiers For 10Ω - 10Ω Series Control Valves

These power amplifiers can drive two solenoid of 10Ω load simultaneously or separately, and the control can be done in the same way even though the object is separated by pressure system and flow rate system. Although the display of control unit on the front panel is **PRESS** and **FLOW**, they are exactly the same circuit, so there is no distinction between the two system when used.



■ Model Number Designation

AME	-D2	-1010	-11
Series Number	Type of Function	Coil Resistance of Valve	Design Number
AME	D2: DC Input Type	1010: 10 Ω × 2	11

■ Specifications

Description	Model No.	AME-D2-1010-11
Type of Function		DC Input Type
Max. Output Current		1 A (10 Ω Solenoid)
Max. Input Voltage		+ 10 V DC
Input Impedance		10 kΩ
Max. Gain		1 A / 5 V
Dither		Variable 100-300 mA
Temperature Drift (Max.)		0.2 mA /°C
Power Supply		85 - 264 VAC
Power Input (Max.)		120 VA
Ambient Temperature		0-50°C (32-122°F)
External Setting Resistance		1 kΩ
Approx. Mass		4.3 kg (9.5 lbs.)

■ Instructions

Power supply for the setting adjuster up to two set can be provided from this power amplifier. However, please use the variable resistor or potentiometer of which impedance is 1 kΩ for the setting adjuster.

■ Applicable to Valve

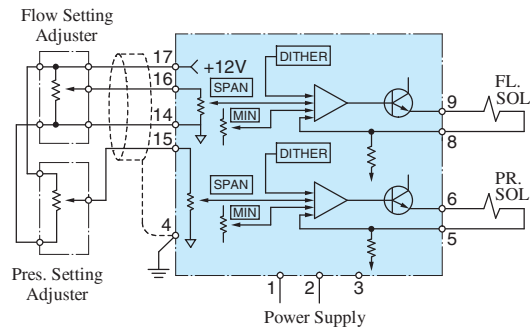
Name of Valve	Model Numbers
Pilot Relief Valves	EDG-01*
Relief Valves	EBG-03 EBG-06 EBG-10
Relieving and Reducing Valves	ERBG-06 ERBG-10
10 Ω Series Flow Control Valves	EFG-03/06 EFCG-03/06
10 Ω-10 Ω Series High Flow Series Flow Control and Relief Valves	EFBG-03 EFG-06 EFG-10

■ Applicable to Piston Pump

Name of Pump	Model Numbers
"A" Series Variable Displacement Piston Pump	A16-*R-04 A22-*R-04 A37-*R-04 A56-*R-04 A70-*R04 A90-*R04 A145-*R04
Proportional Electro-Hydraulic Load Sensing Type	Also, double pumps combined with the models listed above and fixed displacement vane pumps.

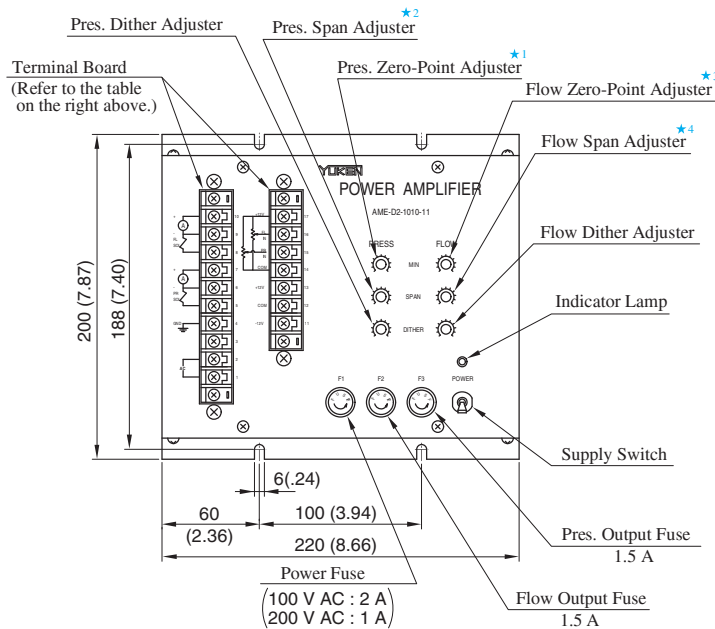
AME-D2-1010-11

[Example Diagram]



● Detail of Terminal Board

Terminal Number	Name
1	Power Supply 85 - 264 VAC
2	
3	Ground G
4	
5	Output to Pressure Control Valve Solenoid PR. SOL
6	
7	Output to Flow Control Valve Solenoid FL. SOL
8	
9	Ammeter
10	
11	-12 V OUT -12 V
12	
13	Common COM
14	
15	Input Signal for PRES. PR.IN
16	
17	Input Signal for FLOW FL.IN
18	



- ★1. Minimum Pressure Setting
- ★2. Variable Pressure Range Setting
- ★3. Minimum Flow Setting
- ★4. Variable Flow Range Setting

DIMENSIONS IN
MILLIMETRES (INCHES)

Power Amplifiers

For Shockless Type Directional and Flow Control Valves

These power amplifiers are used to drive the shockless type proportional and flow control valves.

Model Number Designation

AMN	-G	-10
Series Number	Type of Function	Design Number
AMN	G : Shockless Directional and Flow Control Type	10
	W : DC Input Type	10



Applicable to Valve

Name of Valve	Model Numbers
Shockless Type Proportional Directional and flow Control Valves	EDFG-01

Specifications

Model Numbers		AMN-G-10	AMN-W-10
Description			
Max. Output Current		1.3 A (10 Ω Solenoid)	
Setting Resolution		0 – 99 % (1 % Units)	—
Number of Preselection Pattern		SOLa : 3 Patterns SOLb : 3 Patterns	—
Sequence Input	Input Current	10 mA/24 V	—
	Voltage Range	10 – 28 V	—
Maximum Input Voltage		—	–10 V DC : SOLa +10 V DC : SOLb
Input Impedance		—	10 k Ω
Maximum Gain		—	1.3 A/–5 V : SOLa 1.3 A/+5 V : SOLb
Dither		Variable (Internal)	
Slope Adjustment Range		0 – 99 %/Max. slope time	—
Maximum Slope Time		1 – 99 s	—
Delay Time Adjustment Range		—	0.1 – 3 s
Temperature Drift		0.2 mA / $^{\circ}$ C	
Power Supply		24 V DC (Power Supply Range : 20 – 30 V)	
Power Input		25 W	
Ambient Temperature		0 – 50 $^{\circ}$ C (32 – 122 $^{\circ}$ F)	
Ambient Humidity		90 % RH or less	
Approx. Mass		0.2 kg (.4 lbs.)	

Instructions

Power supply of the outside setting adjuster

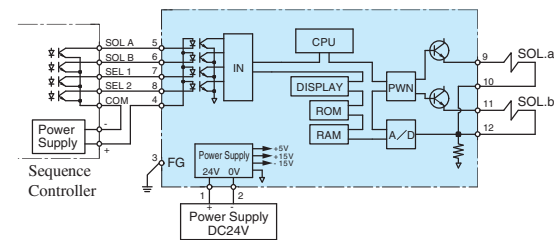
When DC input type (AMN-W) power amplifier is used, power supply for the setting adjuster can be provided from this power amplifier, but for only one. However, please use the variable resistor or potentiometre of which impedance is 1 k Ω for the setting adjuster.

Supply Switch

The power amplifier has no power supply switch. As soon as it is connected to a power supply, it comes to be alive. Provide a power switch externally.

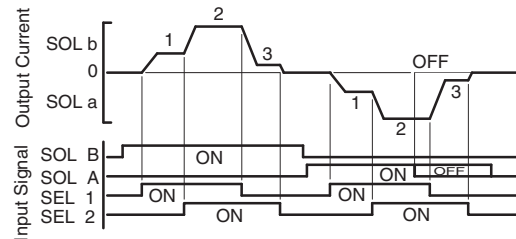
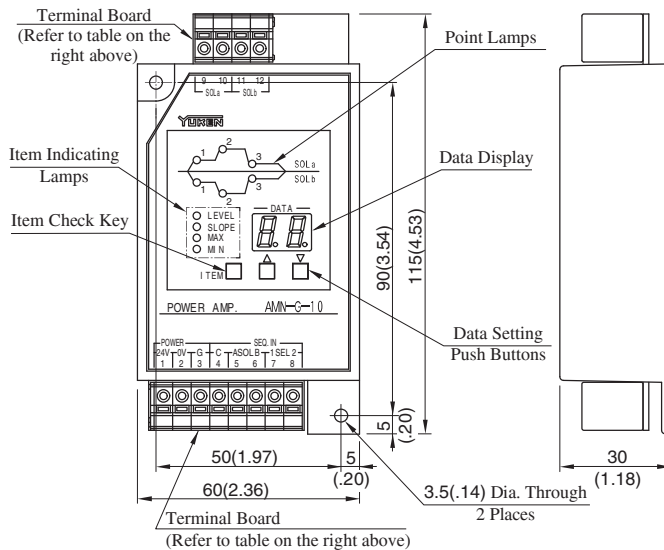
AMN-G-10

[Example Diagram]



Detail of Terminal Board

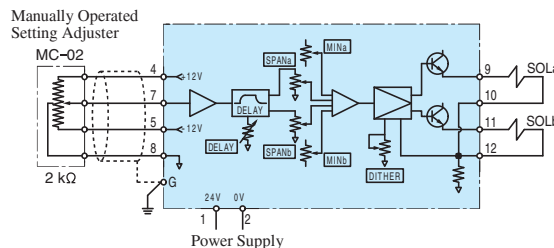
Terminal Number	Name	Terminal Number	Name
1	Power Supply +24V	7	Sequence Input SEL 1
2	Power Supply 0V	8	Sequence Input SEL 2
3	Ground G	9	Output to Valve Solenoid SOL a
4	Sequence Input IN COM	10	Output to Valve Solenoid SOL b
5	Sequence Input SOL A	11	
6	Sequence Input SOL B	12	



DIMENSIONS IN MILLIMETRES (INCHES)

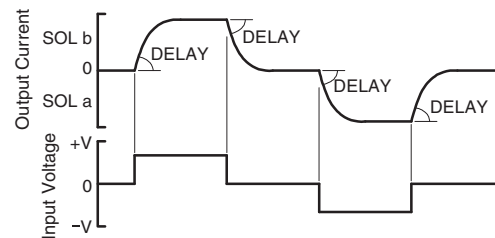
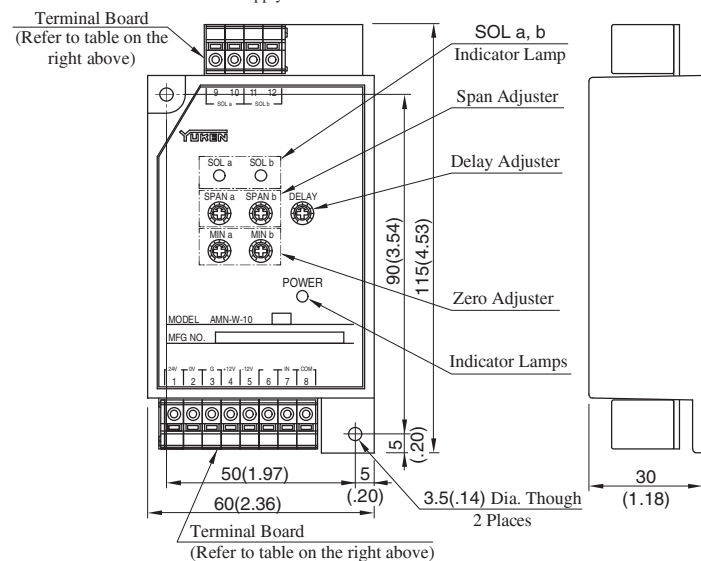
AMN-W-10

[Example Diagram]



Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Power Supply +24V	7	Input Signal IN
2	Power Supply 0V	8	Input Signal COM
3	Ground G	9	Output to Valve Solenoid SOL a
4	Internal Power Supply +12V	10	Output to Valve Solenoid SOL b
5	Internal Power Supply -12V	11	
6		12	



DIMENSIONS IN MILLIMETRES (INCHES)

■ Power Amplifiers For Directional and Flow Control Valves

These power amplifiers are used to drive the proportional electro-hydraulic directional and flow control valves.

■ Model Number Designation

SK1091	-D24	-10
Series Number	Power Supply	Design Number
SK1091	D24: 24 V DC	10

■ Applicable to Valve

Name of Valve	Model Numbers
Directional and Flow Control Valve	03 EDFHG-04 06



■ Specifications

Model No.	SK1091-D24-10
Description	
Max. Output Current	1 A (10 Ω Solenoid)
Max. Input Voltage	-10 V DC for SOL a +10 V DC for SOL b
Input Impedance	10 k Ω
Max. Gain	1 A / ± 5 V
Dither	Variable
Delay Time Adjustment Range	0.15-3 s
Temperature Drift (Max.)	0.2 mA / $^{\circ}$ C
Power Supply	24 V DC (21-28 V Included Ripple)
Required Current	1.5 A or more
Power Input (Max.)	25 W
Ambient Temperature	0-50 $^{\circ}$ C (32-122 $^{\circ}$ F)
Ambient Humidity	90%RH or less
External Setting Resistance	2 k Ω
Approx. Mass	1.0 kg (2.2 lbs.)

■ Instructions

● Power Supply for the Setting Adjuster

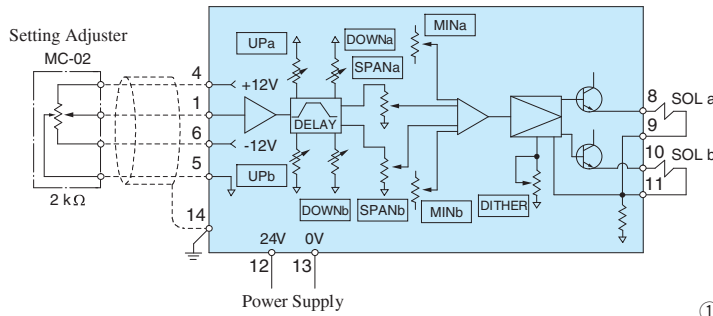
Power supply for the setting adjuster can be provided from this power amplifier, but for only one. However, please use the variable resistor or potentiometre of which impedance is 2 k Ω for the setting adjuster.

● Power Switch

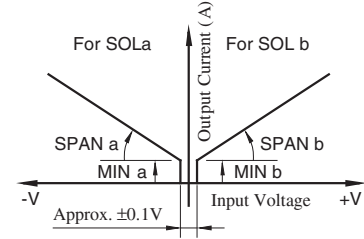
The power amplifier has no power supply switch. As soon as it is connected to a power supply, it comes to be alive. Provide a power switch externally.

SK1091-D24-10

[Example Diagram]

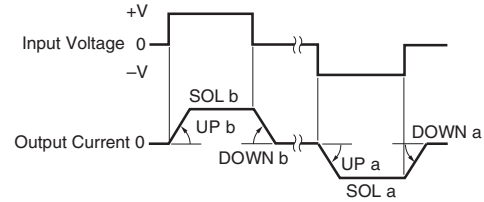


[Input-Output Characteristics]

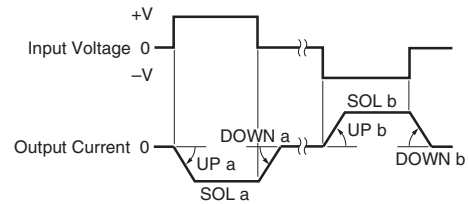


[Delay Function]

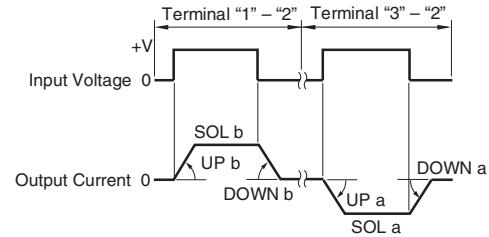
① In case "1" and "2" Input signal terminals are used.



② In case "3" and "2" Input signal terminals are used.



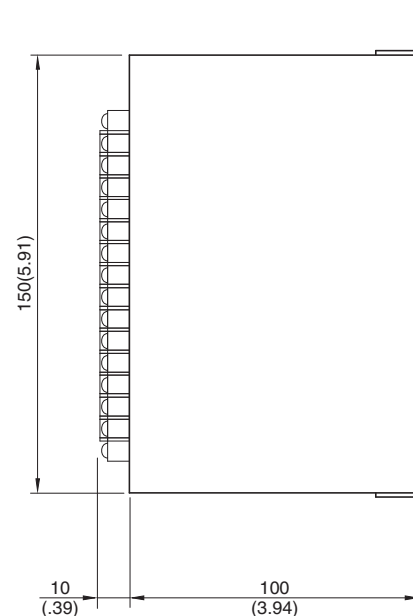
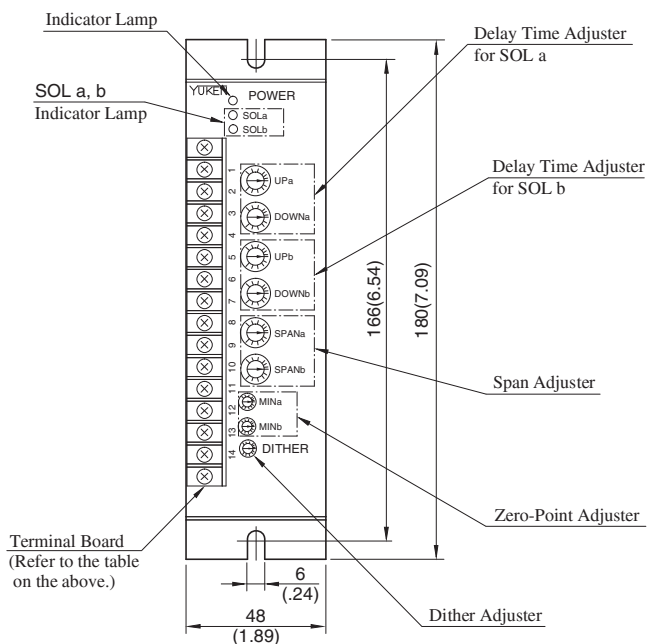
③ In case "1", "2" and "3" Input signal terminals are used.



Detail of Terminal Board

Terminal Number	Name
1	Input Signal IN *
2	Input Signal COM
3	Input Signal IN *
4	Power Supply for Setting Adjuster +12V
5	Power Supply for Setting Adjuster COM
6	Power Supply for Setting Adjuster -12V
7	—
8	Output to Valve Solenoid SOL a
9	Output to Valve Solenoid SOL b
10	Output to Valve Solenoid SOL b
11	Output to Valve Solenoid SOL a
12	Power Supply 24 V
13	Power Supply 0 V
14	Frame Ground FG

★ Three (3) usages are available as shown ① to ③ of "Delay Function" at right hand side for input signal terminal (IN).



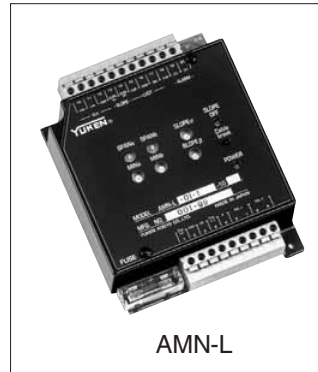
Power Amplifiers

For High Response Type Directional and Flow Control Valves

These power amplifiers are used to drive the high response type proportional electro-hydraulic directional and flow control valves.

A compact AMN-L model and a euro card type AMB-EL model are available.

The single height [3U: 100 × 160 mm (3.94 × 6.30 in.)] is employed for the euro card size of the AMB-EL model.



AMN-L



AMB-EL

Model Number Designation

AMN-L

AMN	-L	-01	-3	-2P	-10
Series Number	Type of Function	Size of Applicable Valve	Compensation	Applicable Spool Type	Design Number
AMN	L: DC Input Type Directional and Flow Control with Miner feedback	01: 01 Size	1: Type 1 3: Type 3	None: 3C2, 3C40 2P: 3C2P	10

AMB-EL

AMB	-EL	-03	-2P	-1	-10
Series Number	Type of Function	Size of Applicable Valve	Applicable Spool Type	Compensation	Design Number
AMB	EL: DC Input Type Directional and Flow Control with Miner feedback	01: 01 Size 03: 03 Size 04: 04 Size 06: 06 Size	None: 3C2, 3C40 2P: 3C2P	★ 1 1: For flow rate 40/80 L/min (10.6/21.1 U.S.GPM) 2: For flow rate 280 L/min (74.0 U.S.GPM) 3: For flow rate 350 L/min (92.5 U.S.GPM) 4: For flow rate 500 L/min (132 U.S.GPM)	10

Please refer to us for ★ 1.

Specifications

Model Numbers Description	AMN-L-01-1	AMN-L-01-3-2P	AMB-EL-01	AMB-EL-03	AMB-EL-04	AMB-EL-06
Max. Output Current	2.5 A (3.9 Ω Solenoid)		2.5 A (3.9 Ω Solenoid)	3.0 A (3 Ω Solenoid)	2.5 A (3.9 Ω Solenoid)	
Max. Input Voltage	+10 V DC: P→B→A→T -10 V DC: P→A→B→T		±10 V / ±5 V			
Input Impedance	10 kΩ or more		100 kΩ (50 kΩ in single-end mode)			
Slope-off input	Terminal Number 13-14 Short	—	4 – 28 V			
Slope Adjust Time	0.03 – 5 s	—	0.05 – 5 s (Slope Adjustment function is not available with “AMB-EL- *-2P”)			
Monitor Voltage	±1.5 V / ±3 mm st.		±10 V / rated st.			
Alarm	Open Collector (30 V DC, 10 mA Max.)		Open Collector (30 V DC, 10 mA Max.)			
Supply Voltage Range	24 V DC (20 – 30 V DC)		24 V DC (21 – 28 V DC)			
Power Input	75 W		30 W	40 W	30 W	
Ambient Temperature	0 – 50 °C (32 – 122 °F)		0 – 50 °C (32 – 122 °F)			
Ambient Humidity	90 % RH or less		85 % RH or less			
Connector	—		DIN 41612 – F32			
Approx. Mass	0.3 kg (.66 lbs.)		0.28 kg (.62 lbs.)		0.34 kg (.75 lbs.)	

Applicable to Valve

Power Amplifiers Model Numbers	Valve Model Numbers
AMN-L	ELDFG-01
AMB-EL	ELDFG-01/03 ELDFHG-04/06

Instructions

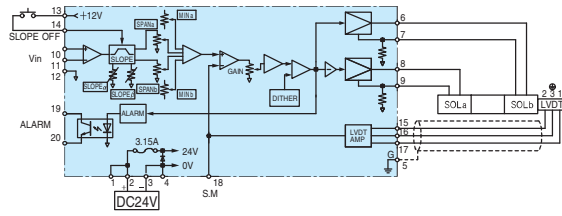
Power Switch

The power amplifier has no power supply switch. As soon as it is connected to a power supply, it comes to be alive.

Provide a power switch externally.

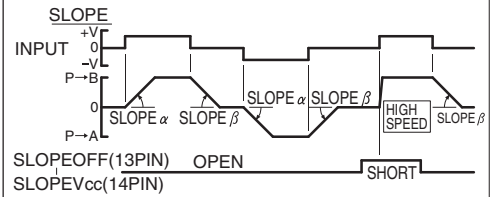
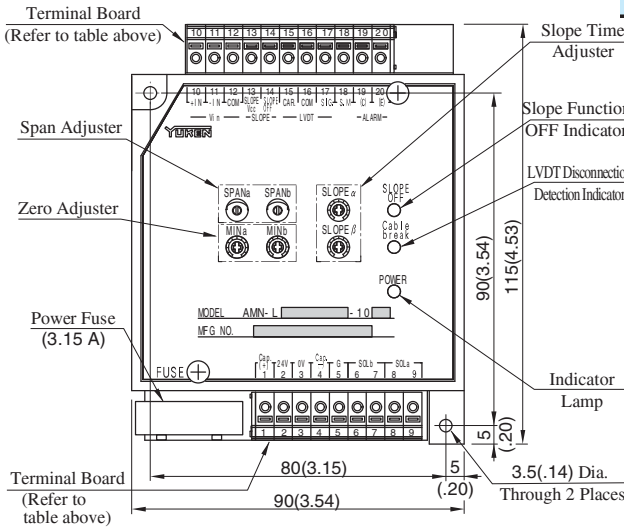
AMN-L-01-1-10

[Example Diagram]



Detail of Terminal Board

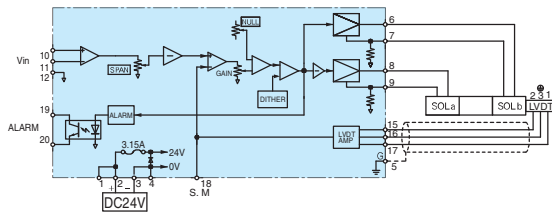
Terminal Number	Name	Terminal Number	Name
1	Power Supply CAPACITOR(+)	11	Input Signal -IN
2	Power Supply +24V	12	Input Signal COM
3	Power Supply 0V	13	Slope Control ON/OFF Terminal SLOPE Vcc
4	Power Supply CAPACITOR(-)	14	Slope Control ON/OFF Terminal SLOPE OFF
5	Frame Ground G	15	LVDT Terminal CAR.
6	Output to Valve SOL b	16	LVDT Terminal COM
7	Solenoid	17	LVDT Terminal SIG.
8	Output to Valve SOL a	18	Sensor Monitor Output S.M
9	Solenoid	19	Alarm Output ALM(C)
10	Input Signal +IN	20	Alarm Output ALM(E)



DIMENSIONS IN MILLIMETRES (INCHES)

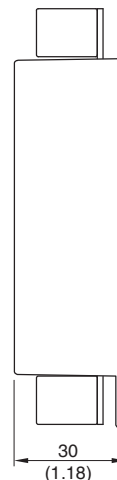
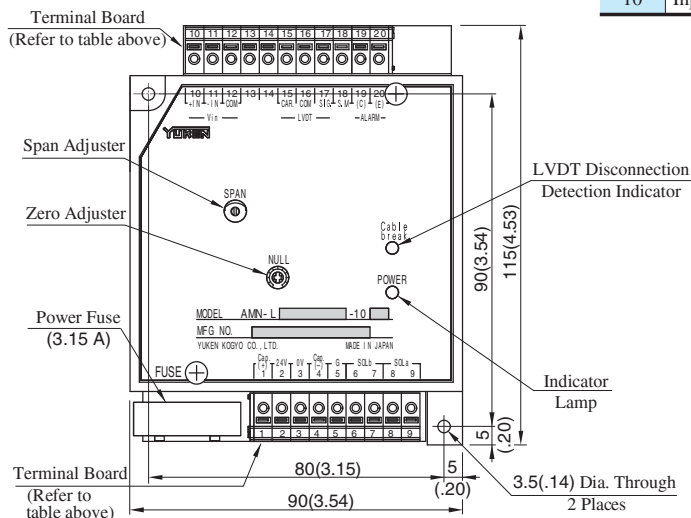
AMN-L-01-3-2P-10

[Example Diagram]



Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Power Supply CAPACITOR(+)	11	Input Signal -IN
2	Power Supply +24V	12	Input Signal COM
3	Power Supply 0V	13	
4	Power Supply CAPACITOR(-)	14	
5	Frame Ground G	15	LVDT Terminal CAR.
6	Output to Valve SOL b	16	LVDT Terminal COM
7	Solenoid	17	LVDT Terminal SIG.
8	Output to Valve SOL a	18	Sensor Monitor Output S.M
9	Solenoid	19	Alarm Output ALM(C)
10	Input Signal +IN	20	Alarm Output ALM(E)



DIMENSIONS IN MILLIMETRES (INCHES)

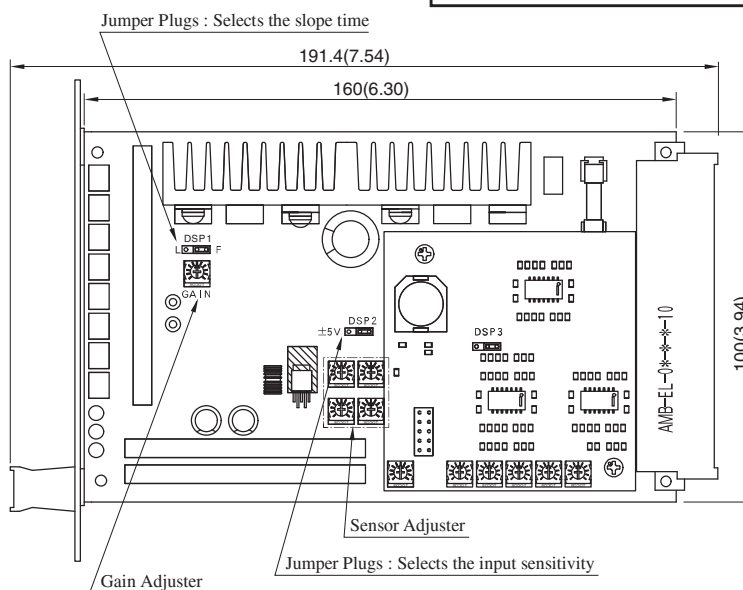
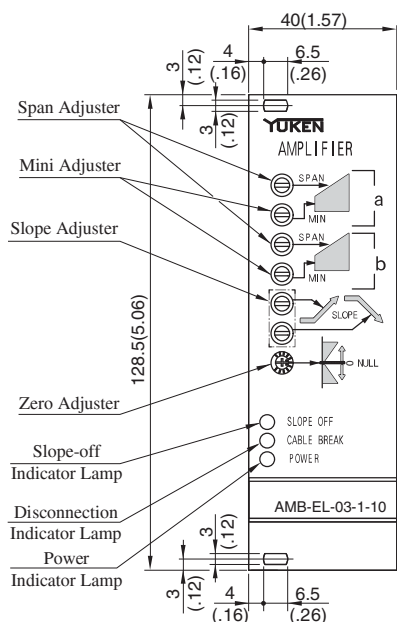
AMB-EL-**-**-10

This power amplifier requires connector cards for connection. A connector card attached model is also available.
Please ask for details if interested.

Pin Connections and Functions

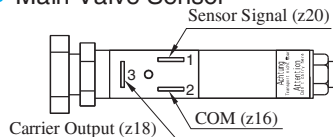
Pin Number	Name	Pin Number	Name
b02	Power Supply 0V	z02	sol a(+)
b04	Power Supply 0V	z04	sol a(-)
b06	sol b(+)	z06	_____
b08	sol b(-)	z08	_____
b10	_____	z10	Command Input (+)
b12	_____	z12	Command Input (-)
b14	COM	z14	_____
b16	Power Supply +24V	z16	COM (No.2)
b18	Power Supply +24V	z18	Carrier (No.3)
b20	Slope Off	z20	Signal (No.1)
b22	COM (No.3)	z22	_____
b24	Signal (No.1)	z24	Alarm Output (-)
b26	Carrier (No.2)	z26	Alarm Output (+)
b28	Output 24V	z28	Stroke Monitor Signal (P)
b30	Output 24V	z30	Stroke Monitor Signal (S)
b32	FG	z32	_____

DIMENSIONS IN MILLIMETRES (INCHES)

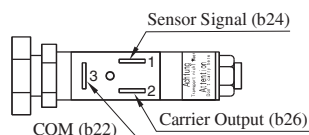


Sensor Connection

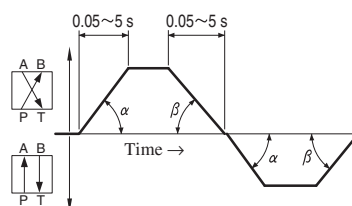
Main Valve Sensor



Pilot Valve Sensor

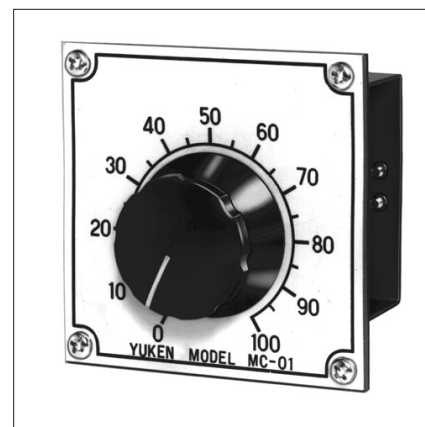


Lamp Pattern



Setting Adjusters

The setting adjuster supplies the command signal voltage to the power amplifier. Since the setting adjuster is closely related to actual machine operating procedure, the user generally provides this device. Yuken makes the following standard setting adjusters for general use and designs and manufactures special setting adjusters to order.

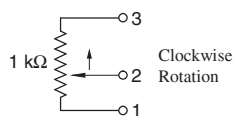


Type	Model Number	Function
Manually Operated Setting Adjuster	MC-01	This is the simplest setting adjuster, consisting of a trimmer (1 k Ω) and a dial.
	MC-02	Consisting of a centre-tapped trimmer (1 k Ω - 1 k Ω) and a dial, this setting adjuster is ideal for a servo system.
6-point Setting Adjuster	AMC-V6-S-*-10	Six trimmers are incorporated, so it is possible to set six points.
Multifunction Slope Controller	AMC-T-20	This multifunction slope controller generates any desired two-channel analog voltage pattern outputs. It can also be used with slope-proportional and time-proportional systems.
Slope Controller	AMN-T-10	Slope and output can be set optionally 4-bit signal.

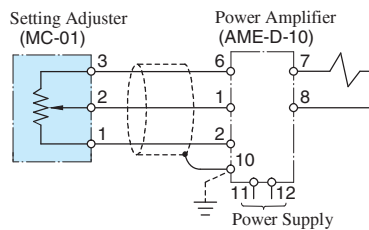
Manually Operated Setting Adjuster

MC-01

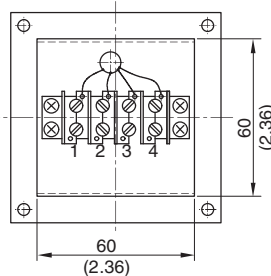
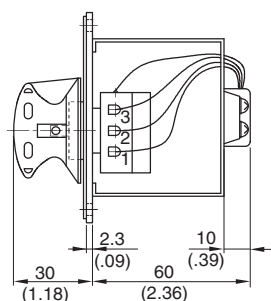
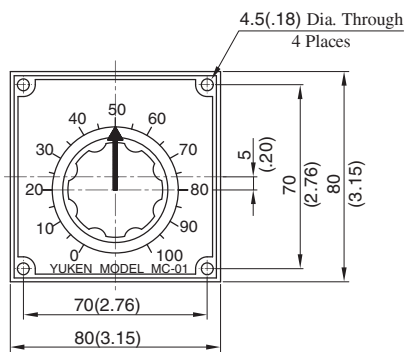
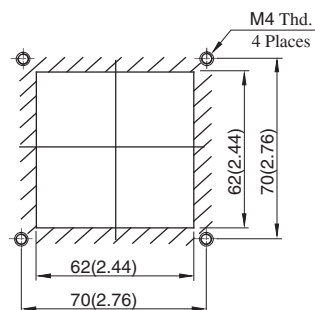
[Electric Circuit]



[Example Diagram]



[Mounting Panel]



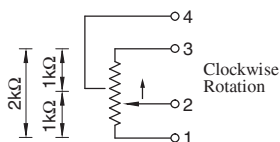
**DIMENSIONS IN
MILLIMETRES (INCHES)**

MC-02

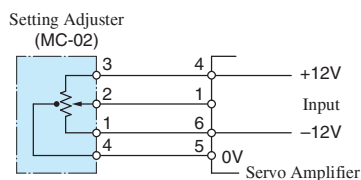
[How to Use]

This setting adjuster is for using positive and negative voltages to the right and left of the zero point. Most suitable for servo systems. Please contact us for usage details.

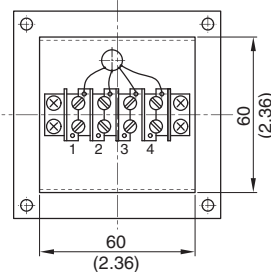
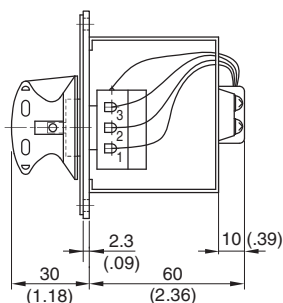
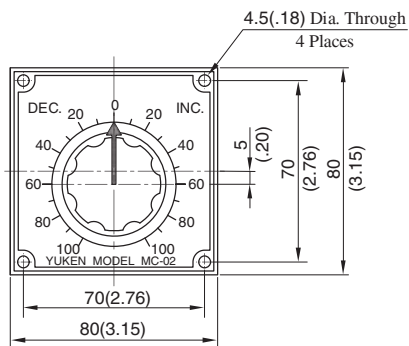
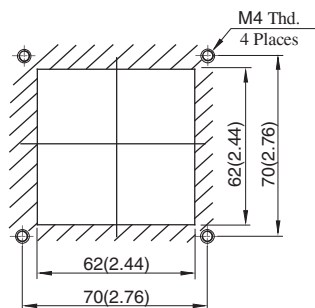
[Electric Circuit]



[Example Diagram]



[Mounting Panel]



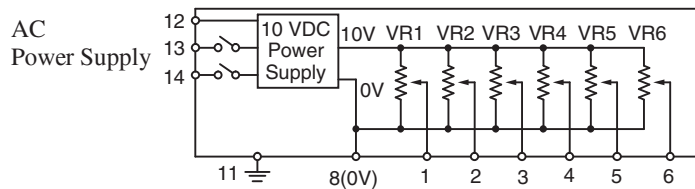
**DIMENSIONS IN
MILLIMETRES (INCHES)**

6-Point Setting Adjuster

AMC-V6-S-*-10

Power Supply
 100 100 VAC
 200 200 VAC
 220 220 VAC

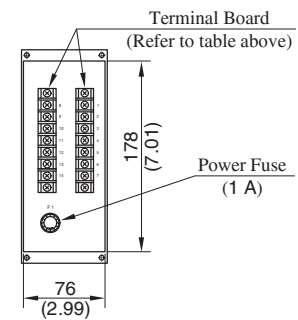
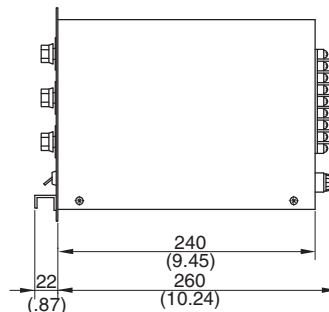
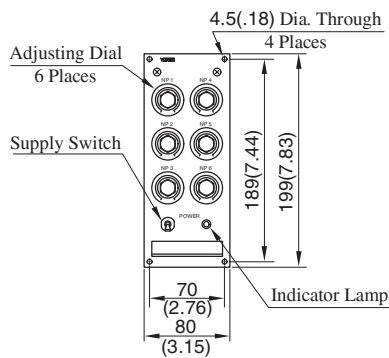
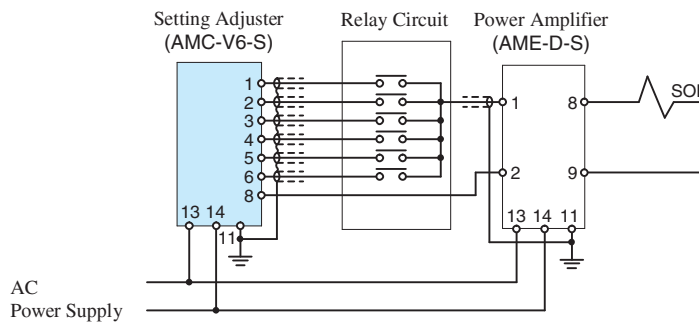
[Electric Circuit]



● Detail of Terminal Board

Terminal Number	Name
1	1 OUT (VR1)
2	2 OUT (VR2)
3	3 OUT (VR3)
4	4 OUT (VR4)
5	5 OUT (VR5)
6	6 OUT (VR6)
7	—
8	0V COM
9	—
10	—
11	Ground G
12	Power Supply 85 – 265 VAC
13	
14	

[Example Diagram]



DIMENSIONS IN
MILLIMETRES (INCHES)

Multifunction Slope Controllers

This controller can generate any desired two-channel analog voltage pattern outputs and can be used with slope-constant and time-constant systems. Although two-channel outputs can be used independently, this controller can also be used as a setting adjuster for the EH Series variable piston pumps.



Model Number Designation

AMC	-T	-20
Series Number	Type of Function	Design Number
AMC: Setting Adjuster	T: Acceleration/deceleration signal type (Slope Controller)	20

Specifications

Model No.	AMC-T-20
Description	
Number of Output Channels	2 channels (A, B)
Maximum Output Range	0 - +5 V ★, 0 - ±5 V, 0 - +10 V, 0 - ±10 V (The settings are DIP switch selectable)
Two Categories of Slopes	Slope-constant ★ With a level change, the slope will not change (but arrival time changes.) Time-constant With a level change, the time will not change (but the slope changes.) } (to be selected by DIP switch)
Acceleration/Deceleration Signal Type	4 Types Polygonal Line Signal ★ : 1 Type (to be selected by DIP switch) Curve Compensation Signal : 3 Types
Max. Slope Time	5 s ★, 20 s, 50 s, 100 s (The settings are DIP switch selectable)
Setting Resolution	The level and slope settings are variable in 0.1% units from 0 to ±99.9%
Control Mode Number of Preselected Patterns	Mode 1, 4-bit binary code input, 15 patterns Mode 2, 6-bit binary code input, 63 patterns Mode 3, Timer control, 9 patterns (4 variations)
Stop Mode (Applicable Only for Control Mode 1)	ON : The stop mode is to retain the state of controller output at the instant an external input signal is interrupted. When the external signal is input again, the operation is resumed from the retained state. OFF ★ : When external input signal is interrupted, function goes back to the initial setting (Pattern No.0).
Control Input Signal	Current input type, 10 mA /bit max. Usable as a voltage input type (voltage range: 8 to 48V DC) Photocoupler insulation input
Control Output Signal	Output from transistor open collector Max. 30V, 50 mA
Data Save	EEP-ROM (Battery not needed)
Power Supply	100/200 V AC, 50/60 Hz (85-260 V AC)
Power Input	10 VA or less
Ambient Temperature	0-50°C (32-122°F)
Ambient Humidity	85%RH or less (Bedewing must be avoided)
Approx. Mass	1 kg (2.2 lbs.)

Note: ★ Indicates preset conditions.

Instructions

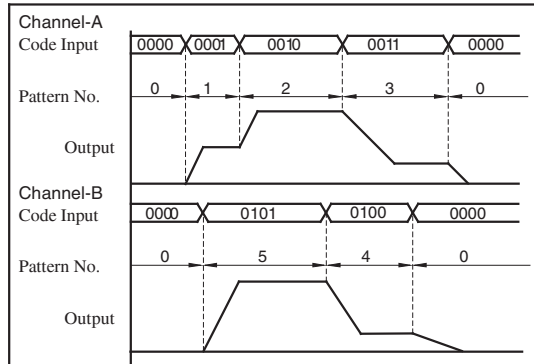
- Since this controller incorporates a micro computer, do subject it to undue electrical noise.

Control Modes

One among the following three types of control modes can be chosen by changing DIP switch.

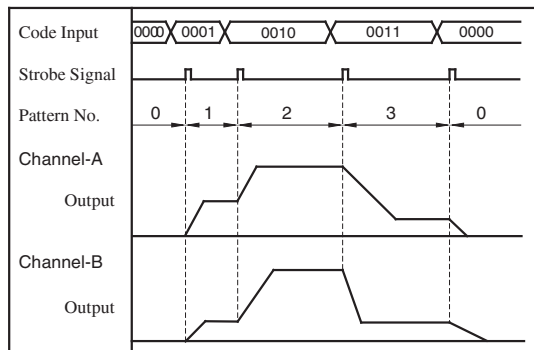
Control Mode 1

Channels A and B generate optional slopes independently each other.



Control Mode 2

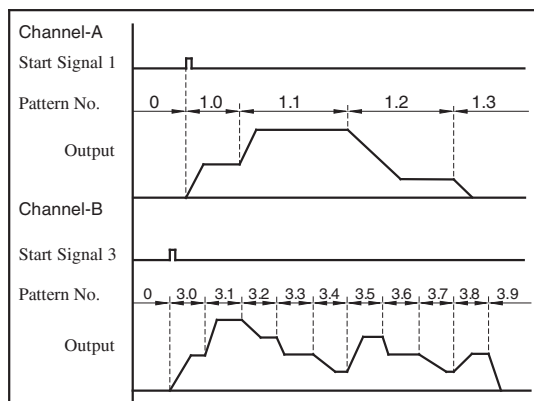
A slope is generated by a strobe signal (signal for change to next signal). Channels A and B operate synchronously.



Control Mode 3

The internal timer is activated by a start signal, causing the slopes to be generated successively in memory.

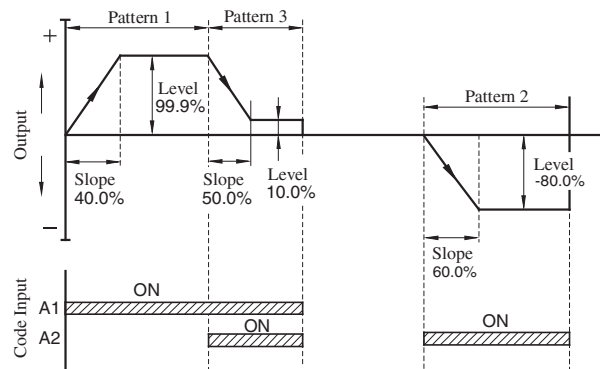
Channels A and B operate independently.



Setting Example

Control Mode 1 Channel - A

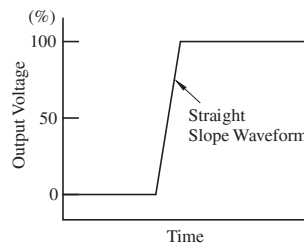
Code Input				Pattern No.	Setting %		Remarks
A8	A4	A2	A1		Level	Slope	
OFF	OFF	OFF	OFF	0	0	0	Stop
OFF	OFF	OFF	ON	1	99.9	40.0	Cylinder forward acceleration
OFF	OFF	ON	OFF	2	-80.0	60.0	Cylinder backward acceleration
OFF	OFF	ON	ON	3	10.0	50.0	Cylinder forward deceleration
ON	ON	ON	ON	15	10.0	10.0	



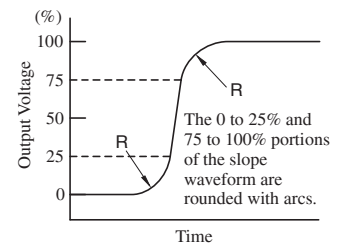
Slope Type

One among the following four types can be chosen by changing DIP switch.

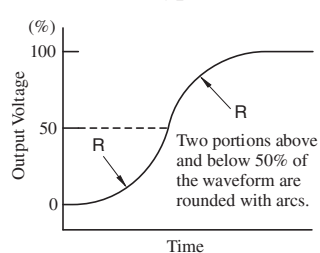
Type 1



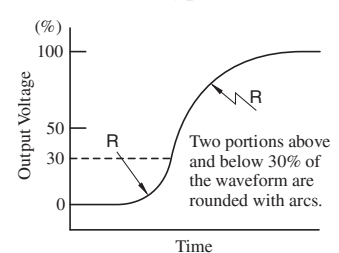
Type 2



Type 3

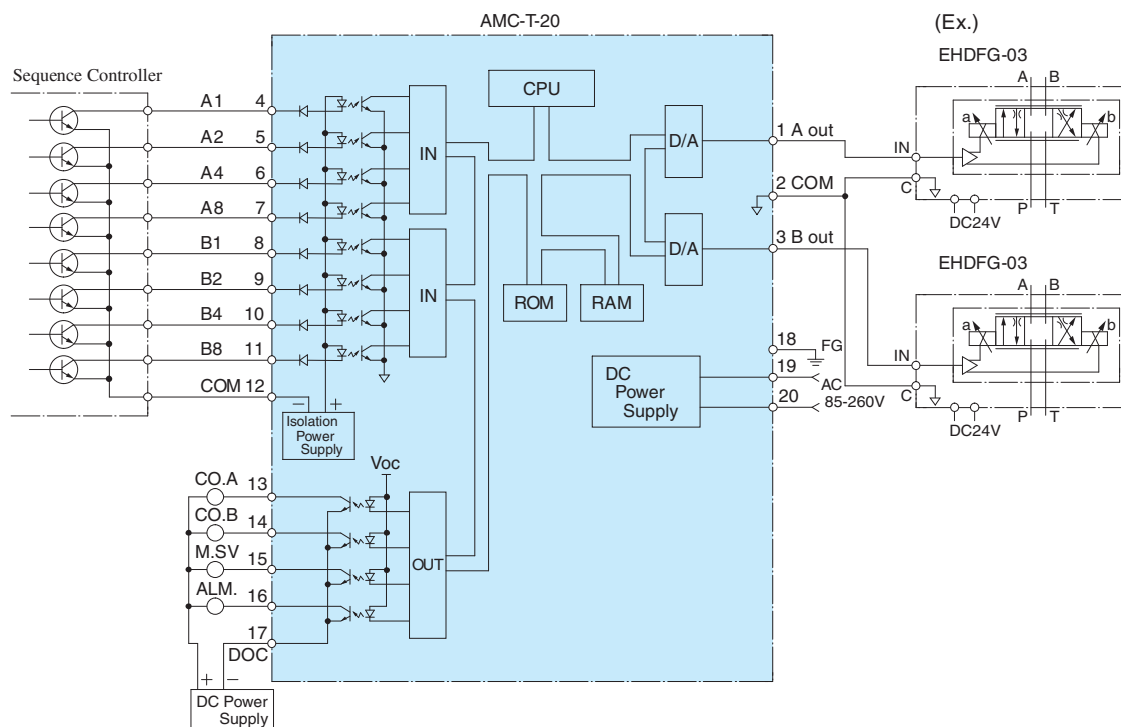


Type 4



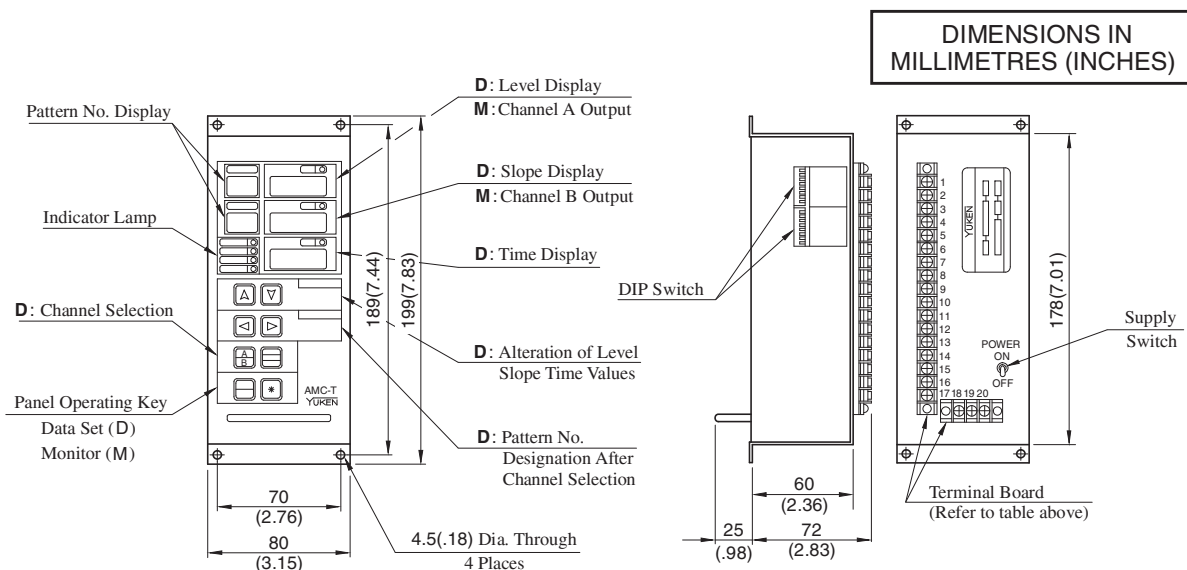
AMC-T-20

[Example Diagram]



Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Channel A Output	11	Code Input B8
2	Common	12	Code Input Common DCOM
3	Channel B Output	13	Coincidental Output Signal with "A" CO.A
4	Code Input	14	Coincidental Output Signal with "B" CO.B
5	Code Input	15	Data Save Signal M.SV
6	Code Input	16	Alarm Signal Output ALM.
7	Code Input	17	Output Common DOC
8	Code Input	18	Frame Ground FG
9	Code Input	19	Power Supply AC
10	Code Input	20	



Interchangeability between Current and New Design

Specifications

Specifications unchanged unless specified below.

Description	Model No.	New : AMC-T-20	Current : AMC-T-10
Control Output Signal		Output from transistor open collector Max. 30 V, 50 mA	Output from transistor open collector Max. 30 V, 10 mA
Slope Types	4 Types	Polygonal Line Signal : 1 Type Curve Compensation Signal : 3 Types (to be selected by DIP switch)	1 Type : Polygonal Line Signal
Stop Mode (Applicable only for Control Mode 1)		ON, OFF	—
Data Save		EEP-ROM Battery not needed	Battery Required
Approx. Mass		1 kg (2.2 lbs.)	1.8 kg (4.0 lbs.)

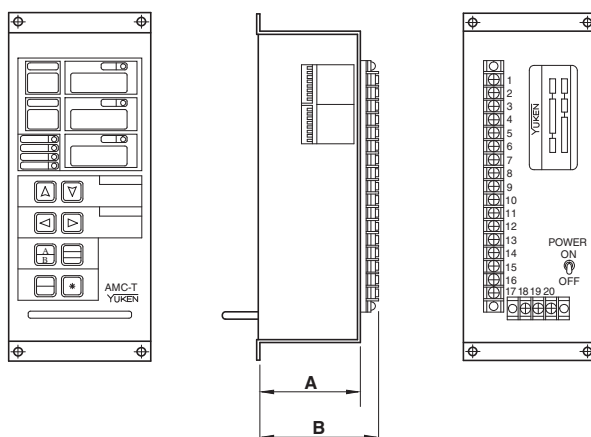
Terminal

The following are differences between current and new.

Terminal Number	Name		Remarks
	New : Design 20	Current : Design 10	
13	Coincidental Output Signal with "A" "CO.A"	Coincidental Output Signal with "A" "DO1"	Abbreviation of the terminals are changed, though functionally the same.
14	Coincidental Output Signal with "B" "CO.B"	Coincidental Output Signal with "B" "DO2"	
15	Data Save Signal "M.SV"	—	Added new functions.
16	Alarm Signal Output "ALM."	—	

Interchangeability in Installation

There is an interchangeability in installation, although depths (dimensions "A" and "B") are different.



Model Numbers		mm (Inches)	
		A	B
Current	AMC-T-10	185 (7.28)	200 (7.87)
New	AMC-T-20	60 (2.36)	72 (2.83)

Slope Controllers

This slope controller is considerably smaller and lighter compared to conventional slope controllers.

4-bit switching signals allow the pattern output of given levels and acceleration/deceleration times. One-touch disconnection is supported. The mass and the volume have been reduced to one-fifth and one-fourth, respectively.

Model Number Designation

AMN	-T	-10
Series Number	Type of Function	Design Number
AMN	T : Slope Controller	10



Specifications

Model Numbers	AMN-T-10
Description	
Number of Output Channels	1 channel
Maximum Output Range	0 - +5 V (Factory Preset) 0 - +10 V ±5 V ±10 V
Maximum Slope Time	● Slope-constant type: ★1 1-9999 s/Max. Output signal (Factory Setting, 5 s) ● Time-constant type: ★2 1-9999 s (Can be set in 1 second increments)
Acceleration/Deceleration ★3 Signal Type	Polygonal Line Signal: 1 Type (Factory Setting) Curve Compensation Signal: 3 Type
Setting Resolution	The level and slope setting are variable in 0.1 % units from 0 to ±99.9%
Number of Preselected Patterns	4-bit binary code input 15 patterns
Sequence Input	Input Current: 10 mA/24 V Voltage Range: 10 - 28 V
Sequence Output	Load Current: Max. 50 mA Supply Voltage: Max. 32 V
Power Supply Voltage	24 VDC (20 - 30 VDC)
Power Input	3 W
Ambient Temperature	0 - 50 °C (32 - 122 °F)
Ambient Humidity	90 % RH or less
Approx. Mass	0.2 kg (.44 lbs)

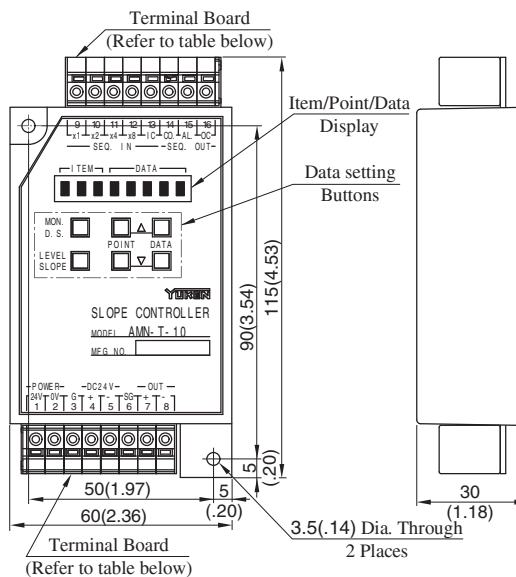
- ★1. A fixed slope means that the slope endpoint time changes while the slope gradient remains unchanged when the level is changed.
- ★2. A fixed time means that the slope endpoint time remains unchanged when the level is changed.
- ★3. The same slope types as those for the multifunction slope controller are supported. See page 789 for details.

Instructions

- Since this controller incorporates a micro computer, do subject it to undue electrical noise.

AMN-T-10

DIMENSIONS IN MILLIMETRES (INCHES)



● Detail of Terminal Board

Terminal Number	Name	Terminal Number	Name
1	Power Supply +24V	9	Sequence Input ×1
2	Power Supply 0V	10	Sequence Input ×2
3	Frame Ground G	11	Sequence Input ×4
4	Internal Power Supply +24V	12	Sequence Input ×8
5	Internal Power Supply 0V	13	Sequence Input IN COM
6	Signal Ground SG	14	Sequence Output COL N.
7	Output Signal +	15	Sequence Output ALARM
8	Output Signal -	16	Sequence Output OUT COM

[Example Diagram]

