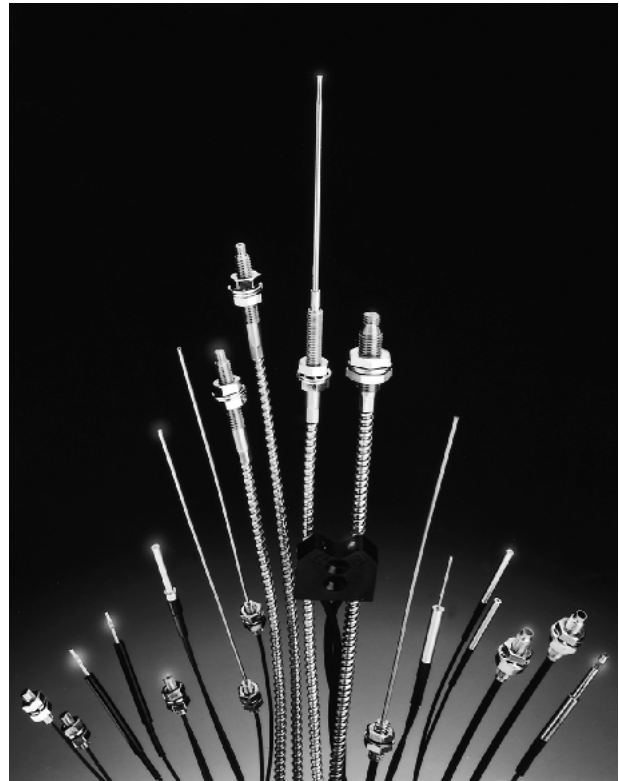


### Fiber-Optic Sensing Heads Offer a Wide Variety of Unique Solutions for Tough Problems

- Fiber-optic sensors detect small, fast-moving objects in space-confined installations and harsh environments
- For a custom fit in the field, most plastic filament cables can be cut to length
- For detection in hard-to-reach places, sensing heads with bendable stainless steel tubing retain complex shapes
- Coiled and ultra-flexible cables are ideal for flexing and reciprocating machinery such as robots
- Side-view sensing heads or accessories save space in right-angle detection
- Convergent beam sensing heads allow accurate positioning and background suppression even for shiny objects
- Narrow detection zone of concentric beam sensing heads helps eliminate background objects and gives consistent sensing, regardless of object direction
- Highly flexible fibers with minimum 1-mm bending radius allows cable to conform to machine contours
- Most fiber cables offer IP67 protection and temperature ratings of  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $158^{\circ}\text{F}$ )



## ■ FIBER-OPTIC CABLE AND AMPLIFIER COMPATIBILITY

Fiber cables Part number	DIN-rail mounting amplifiers							Block style amplifiers			
	E3X-A	E3X-DAN	E3X-F	E3X-H, -NH	E3X-NM	E3X-NT, -NV	E3X- NVG,-VG	E3MC- MY	E3XA- CC4A	E3JU-XR E3JU-X	E3A2-X E3S-X3
<b>Through-beam, General Purpose Type</b>											
E32-T11	OK	OK	OK	OK	OK	OK	OK	--	--	OK (-XR)	--
E32-T11L	OK	OK	OK	OK	OK	OK	OK	OK	--	--	--
E32-T11R	OK	OK	--	OK	OK	OK	--	--	--	--	--
E32-T12L	OK	OK	OK	OK	OK	OK	OK	--	--	--	--
E32-T17L	OK	OK	OK	OK	OK	OK	OK	OK	--	--	--
E32-T21	OK	OK	OK	OK	OK	OK	OK	--	--	OK (-XR)	--
E32-T21L	OK	OK	OK	OK	OK	OK	OK	--	--	--	--
E32-T21R	OK	OK	--	OK	OK	OK	--	--	--	--	--
E32-T22	OK	OK	OK	OK	OK	OK	OK	--	--	OK (-XR)	--
E32-T22L	OK	OK	OK	OK	OK	OK	OK	--	--	--	--
E32-TC50	OK	--	OK	OK (-H)	--	--	OK (-VG)	--	--	--	--
E32-TC200	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK (-XR)	OK
E32-TC200A	OK	OK	OK	OK	OK	OK	OK	--	OK	--	OK
E32-TC200C	OK	--	OK	OK	OK	OK	OK	--	--	--	OK
E32-TC200E	OK	OK	OK	OK	OK	OK	OK	--	OK	-	OK
E32-TC500	OK	--	OK	OK (-H)	--	--	OK (-VG)	--	--	--	--
E32-TC1000	OK	--	OK	OK (-H)	--	--	OK (-VG)	--	--	--	--
<b>Through-beam, Armored Type</b>											
E32-UTAT13F	OK	--	--	--	--	--	--	--	--	OK (-XR)	--
E32-UTAT16F	OK	--	--	--	--	--	--	--	--	OK (-XR)	--
E32-UTBT13F	--	--	--	--	--	--	--	--	--	OK (-X)	--
E32-UTBT16F	--	--	--	--	--	--	--	--	--	OK (-X)	--
<b>Through-beam, Probe Type</b>											
E32-T33-1	OK	--	OK	OK (-H)	--	--	OK (-VG)	--	--	--	--
E32-TC200B	OK	OK	OK	OK	OK	OK	OK	--	OK	--	OK
E32-TC200B4	OK	OK	OK	OK	OK	OK	OK	--	OK	--	--
E32-TC200D	OK	--	OK	OK	--	--	OK (-VG)	--	--	--	OK
E32-TC200D4	OK	--	OK	OK	--	--	OK (-VG)	--	--	--	--
E32-TC200F	OK	OK	OK	OK	OK	OK	OK	--	OK	--	OK
E32-TC200F4	OK	OK	OK	OK	OK	OK	OK	--	OK	--	--
<b>Through-beam, Side Sensing Type</b>											
E32-T14	OK	OK	OK	OK	OK	OK	OK	--	OK	--	--
E32-T14L	OK	OK	OK	OK	OK	OK	OK	--	--	--	--
E32-T16	OK	OK	OK	OK	OK	OK	OK	OK	OK	--	--
E32-T16P	OK	OK	--	OK (-NH)	OK	OK	--	--	OK	--	--
E32-T24	OK	OK	OK	OK	OK	OK	OK	--	--	--	--
<b>Through-beam, High Temperature Type</b>											
E32-T51	OK	OK	OK	OK	OK	OK	OK	--	--	OK (-XR)	--
E32-T61	OK	OK	OK	OK	OK	OK	OK	--	--	--	--
<b>Through-beam, Special Purpose Type</b>											
E32-G14	OK	OK	OK	OK	OK	OK	OK	--	OK	--	--
E32-M21	OK	OK	OK	OK	OK	OK	OK	--	OK	--	--
E32-T12F	OK	OK	OK	OK	OK	OK	OK	--	--	--	--
E32-T22S	--	OK	--	OK	OK	OK	--	--	--	--	--
E32-T24S	--	OK	--	OK	OK	OK	--	--	--	--	--
E32-T84S	--	OK	--	OK (-NH)	OK	OK	--	--	--	--	--

## ■ THROUGH-BEAM, HIGH TEMPERATURE TYPE

The table specifies the sensing characteristics of each fiber when used with the following amplifiers:

### Legend:

A . . . . . E3X-A (General purpose amplifier)

DAN-HS E3X-DAN (Digital amplifier- high speed mode)

DAN-LD E3X-DAN (Digital amplifier- long distance mode)

DAN-SM E3X-DAN (Digital amplifier- standard distance mode)

F . . . . . E3X-F (High performance amplifier- high speed)

H . . . . . E3X-H11 (High gain amplifier)

NM . . . . . E3X-NM (4 channel auto-tuning amplifier)

NT . . . . . E3X-NT (Auto-tuning amplifier: general purpose)

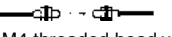

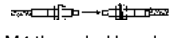
NH . . . . . E3X-NH (High-precision, auto-tuning amplifier)

NHB . . . . E3X-NHB (High-precision, blue LED, auto-tuning amp)

NV . . . . . E3X-NV21 (Water-resistant, red light source amplifier)

NVG . . . . E3X-NVG21 (Water-resistant, green light source amp)

VG . . . . . E3X-VG (Mark sensing amplifier)

Application	Features	Appearance	Type	Detection distance	Min. detectable object (opaque)	Part number
Heat resistant	Resists 150°C; fiber sheath material: fluororesin. Operating ambient temperature: -40°C to 150°C (-40°F to 302°F); 1.5 mm ID fiber	 M4 threaded head x 17 mm (0.67 in) L 2 m (6.56 ft) length	A	200 mm	1.0 mm dia.	<b>E32-T51</b> 
			DAN-HS	280 mm	-----	
			DAN-LD	950 mm	-----	
			DAN-SM	760 mm	0.01 mm dia.	
			F	80 mm	1.0 mm dia.	
			H	400 mm	1.0 mm dia.	
			NH	400 mm	0.4 mm dia.	
			NHB	35 mm	0.4 mm dia.	
			NM	300 mm	0.4 mm dia.	
			NT	320 mm	0.3 mm dia.	
			NV	320 mm	0.3 mm dia.	
			NVG	20 mm	1.0 mm dia.	
			VG	20 mm	1.0 mm dia.	
Heat resistant	Resists 300°C, with spiral tube; high mechanical strength; fiber sheath material: stainless steel. Operating ambient temperature: -40°C to 300°C (-40°F to 572°F); 1 mm ID fiber	 M4 threaded head x 20 mm (0.79 in) L 2 m (6.56 ft) length	A	150 (1,500*) mm	0.2 mm dia.	<b>E32-T61</b>
			DAN-HS	170 (1,300*) mm	-----	
			DAN-LD	570 (4,000**) mm	-----	
			DAN-SM	450 (3,400*) mm	0.01 mm dia.	
			F	60 (450*) mm	0.5 mm dia.	
			H	300 (3,000*) mm	0.3 mm dia.	
			NH	300 (3,000*) mm	0.12 mm dia.	
			NHB	Contact Omron	Contact Omron	
			NM	180 (2,000*) mm	0.2 mm dia.	
			NT	190 (2,100*) mm	0.15 mm dia.	
			NV	190 (2,100*) mm	0.15 mm dia.	
			NVG	18 (130*) mm	0.5 mm dia.	
			VG	18 (130*) mm	0.5 mm dia.	

Note: \* Value in parentheses represents the sensing distance of the fiber when the E39-F1 lens is attached to its tip.

\*\*Value in parentheses is based on each fiber having a cable length of 2,000 mm.

# Specifications

## ■ THROUGH-BEAM FIBER-OPTIC CABLES

Part number	Operating ambient temperature	Operating relative humidity	Permissible bending radius	Core material	Sheath material	Enclosure rating	
E32-T11	-40°C to 70°C (-40°F to 158°F) with no icing	35% to 85% with no condensation	4 mm min.	PMMA	Vinyl chloride	IEC IP67	
E32-T11L			25 mm min.		Black polyethylene		
E32-T11R			1 mm min.		Copolymer vinyl chloride		
E32-T12L			25 mm min.		Black polyethylene		
E32-T17L			25 mm min.		Black polyethylene		
E32-T21			4 mm min.		Vinyl chloride		
E32-T21L			25 mm min.		Black polyethylene		
E32-T21R			1 mm min.		Copolymer vinyl chloride		
E32-T22			25 mm min.		Black polyethylene		
E32-T22L			25 mm min.		Black polyethylene		
E32-TC50 E32-TC200			25 mm min.		Black polyethylene		
E32-TC200A			25 mm min.		Black polyethylene		
E32-TC200C			25 mm min.		Black polyethylene		
E32-TC200E			25 mm min.		Black polyethylene		
E32-TC500 E32-TC1000			25 mm min.		Black polyethylene		
E32-UTAT1-3F E32-UTAT1-6F			-40°C to 150°C (-40°F to 302°F) with no icing		25 mm min.		Glass
E32-UTBT1-3F E32-UTBT1-6F	-40°C to 200°C (-40°F to 392°F) with no icing	SUS 303 head, SUS 304 sheath					
E32-T33-1	-40°C to 70°C (-40°F to 158°F) with no icing	35% to 85% with no condensation	25 mm min.	PMMA	Black polyethylene, stainless steel head	IEC IP67	
E32-TC200B E32-TC200B4			25 mm min.		Black polyethylene		
E32-TC200D E32-TC200D4			25 mm min.		Black polyethylene		
E32-TC200F E32-TC200F4			25 mm min.		Black polyethylene		
E32-T14			25 mm min.		Black polyethylene		
E32-T14L			25 mm min.		Black polyethylene		
E32-T16			25 mm min.		Black polyethylene		
E32-T16P			10 mm min.		Vinyl chloride		IEC IP50
E32-T24			25 mm min.		Black polyethylene		IEC IP67
E32-T51*			-40°C to 150°C (-40°F to 302°F) with no icing		35 mm min.		PMMA
E32-T61	-40°C to 300°C (-40°F to 572°F) with no icing	25 mm min.	Glass	304 stainless steel	IEC IP67		
E32-G14	-40°C to 70°C (-40°F to 158°F) with no icing	35% to 85% with no condensation	25 mm min.	PMMA	Black polyethylene	IEC IP67	
E32-M21			25 mm min.		Black polyethylene		
E32-T12F	-30°C to 70°C (-22°F to 158°F) with no icing	35% to 85% with no condensation	40 mm min.	PMMA	Teflon <sup>®</sup> -covered black polyethylene	IEC IP67	

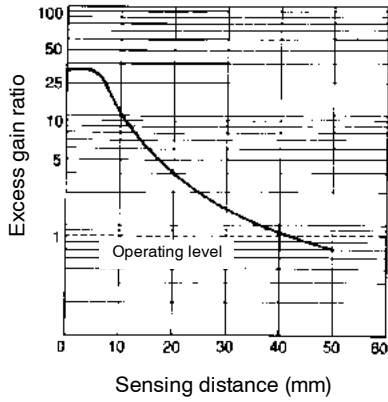
\*When used continuously between -40°C and 130°C (-40°F and 266°F)

Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.

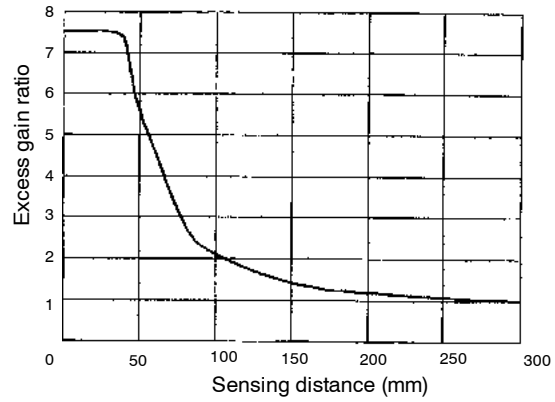
■ EXCESS GAIN RATIO (CONT.)

Through-beam, High Temperature Type

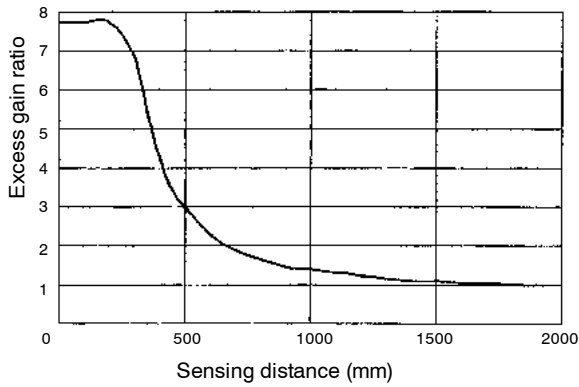
E32-T51 with E3X-A11 amplifier



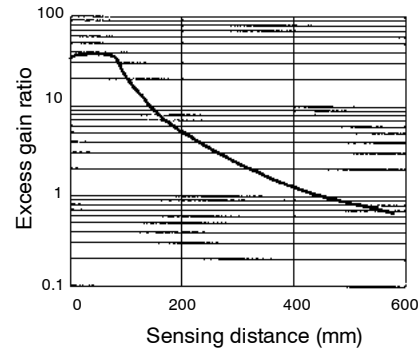
E32-T51 with E3X-NH amplifier



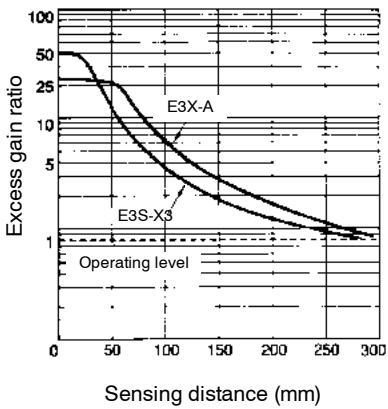
E32-T51 with E39-F1 and E3X-NH amplifier



E32-T51 with E3JU-XR amplifier



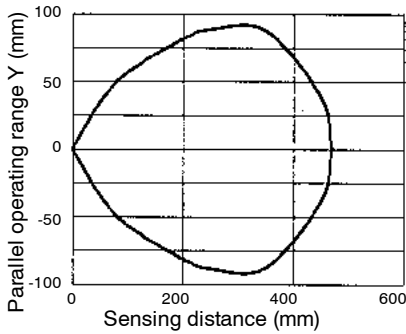
E32-T61 with E3X-A and E3S-X3 amplifiers



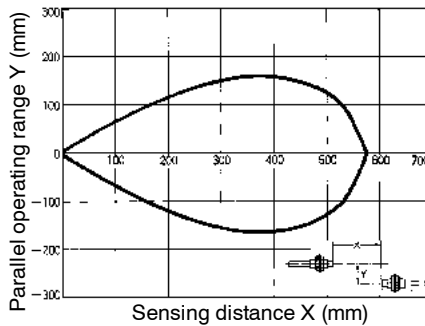
■ OPERATING RANGE (CONT.)

Through-beam, High Temperature Type

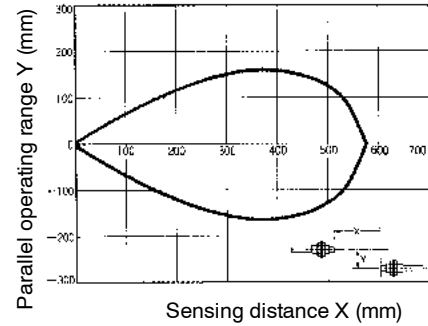
E32-T51 with E3JU-XR amplifier



E32-T61 with E3X-H11 amplifier

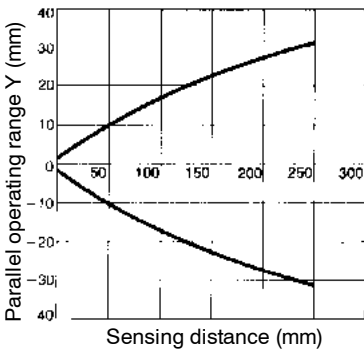


E32-T61 with E3X-NH amplifier

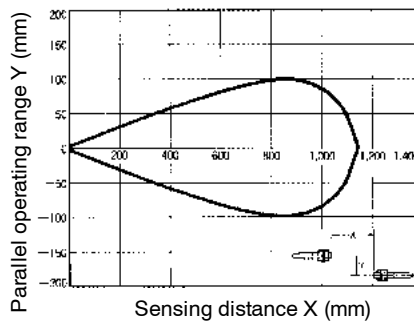


Through-beam, Special Purpose Type

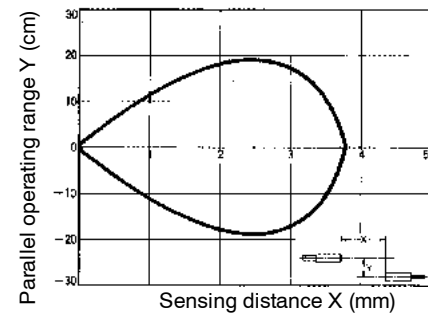
E32-M21 with E3X-A11 amplifier



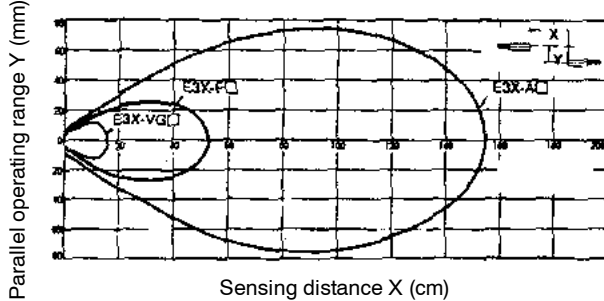
E32-M21 with E3X-NH amplifier



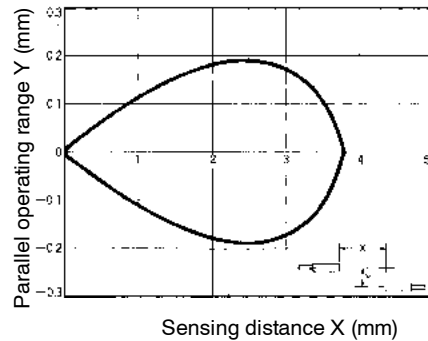
E32-T12F with E3X-NH amplifier



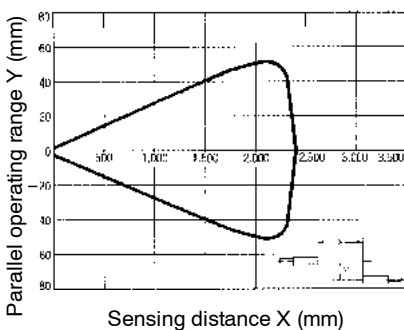
E32-T12F with E3X-A, E3X-F, and E3X-VG amplifiers



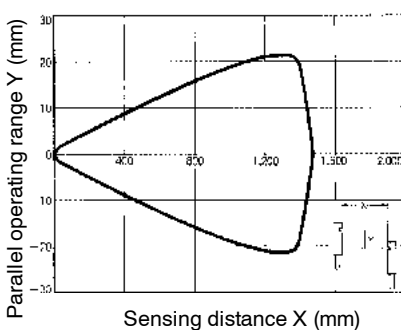
E32-T12F with E3X-H11 amplifier



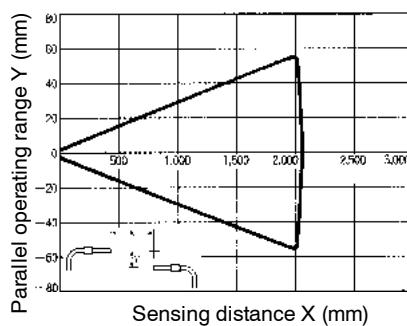
E32-T22S with E3X-NH amplifier



E32-T24S with E3X-NH amplifier



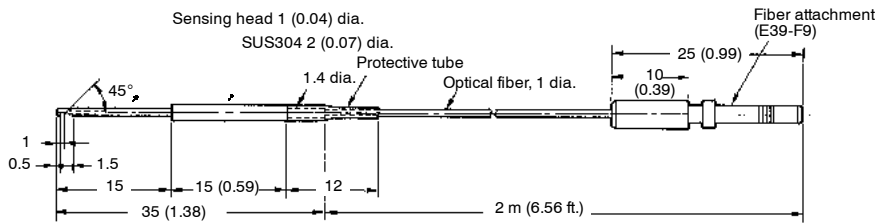
E32-T84S with E3X-NH amplifier



■ THROUGH-BEAM TYPE (CONT.)

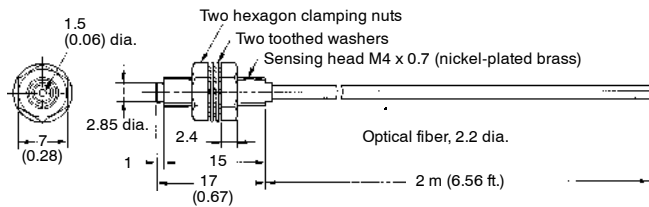
Side Sensing Type

E32-T24



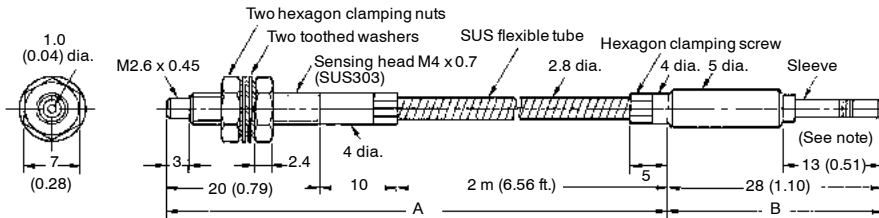
High Temperature Type

E32-T51



Note: Resistant temperature is 150°C (302°F). Resistant temperature is 130°C (266°F) when used continuously.

E32-T61



Note: Section A resists 300°C and section B (which is inserted to the amplifier) resists 110°C. The operating temperature of section B must also be within the withstand temperature range of the amplifier.

Special Purpose

E32-G14

