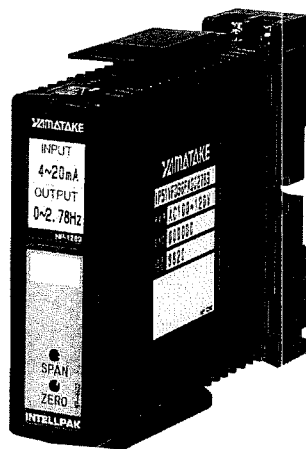


IntellpaK DC Pulse Converter IP51VFD (Output Dropout Not Included) IP51VFS (With Output Dropout)

User's Manual



Yamatake Corporation

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1. Introduction and Specifications

1. INTRODUCTION

The Intellpak IP51VFD, VFS is a thin plug-in system DC pulse converter which converts the analog signal input of each level of voltage and current into a pulse signal output of frequency proportional to that analog value.

2. SPECIFICATIONS

Input part	Input type	DC voltage, DC current. Refer to Table 1.	
	Input impedance	Refer to Table 1.	
	Zero, span adjustment	$\pm 10\%$ FS (3-revolution trimmer)	
Output part	Response time	1 – 10V FS: $20\mu\text{s} + 1/f$ out f out: Output frequency 20 – 50mA FS: $20\mu\text{s} + 1/f$ out Other than above: $1\text{ms} + 1/f$ out	
	Output type	One shot non-contact output	For driving the AC/DC electromagnetic counter relay. ON time: $100\text{ms} \pm 10\%$, Square wave. ON voltage: 2V or less, ON current: 500mA or less, OFF current: 2mA or less, Circuit voltage used: 200V DC, 130V AC or less
		Open collector output	ON voltage: 0.4V or less Rating: 30V DC, 30mA or less Waveform: Square wave with a duty ratio of approx. 50%
		Voltage pulse output	Rating: H; 5V or 12V. Selected by DIP switch L; 0.4V or less Internal resistance: 620W Waveform: Square wave with a duty ratio of approx. 50%
	Output frequency	0 – 0.01Hz FS to 0 – 100kHz FS. However, 0 – 0.01Hz to 0 – 5Hz with the one-shot non-contact output.	
	Monitor output	Output immediately after input is V/F converted. This is output via an optically isolated photo-transistor for checking input or fine adjustment of output.	
	Output dropout	The function of forcibly suppressing the output to zero when the input signal value is 10% or less of the rating.	
General specifications	Accuracy	$\pm 0.1\%$ FS at the reference temperature of 23°C	
	Power supply type	AC	DC
	Rated power voltage	100 to 120V AC 50/60Hz common	24V DC
	Operating power voltage	80 to 132V AC 50/60Hz	24V DC $\pm 10\%$
	Power consumption	Approx. 5.5VA	Approx. 2.7VA
	Starting current	—	0.11A or less
	Peak value and width of current at power ON	10A or less, 1ms	5A or less, 1ms
	Insulation resistance	100M Ω or more between I/O terminal and power terminal, and between I and O terminals, when measured by 500V DC megger.	
Dielectric strength	2000V AC, 1 min between I/O terminal and power terminal and I and O terminals		

General specifications	Power supply characteristic	$\pm 0.1\%$ FS/90 – 132V AC	$\pm 0.1\%$ FS/24V DC $\pm 10\%$
	Temperature characteristic	$\pm 0.05\%$ FS/10°C	
	Operating ambient temperature	– 5 to +55°C, without freezing	
	Storage ambient temperature	– 20 to +70°C, without freezing	
	Operating ambient humidity	90% RH or less, without condensation	
	Storage ambient humidity	90% RH or less, without condensation	
	Vibration resistance	4.9m/s ² or less, 10 to 60Hz, for 2h in each direction of X, Y and Z (with vibration-absorbing bracket mounted)	Not applicable when mounted on DIN rail.
	Shock resistance	490m/s ² or less, 3 times each vertically	
	Case material	Heat resisting ABS resin	
	Case color	Gray, Munsell 2.5PB3.5/1	
	Wiring terminal screw	M3.5	
	Installation	Installed on wall or DIN rail	
	Mass	Approx. 200g (including the base socket)	

Standard accessories	Base socket, Part No. QN719A
Auxiliary parts (option)	Vibration-absorbing bracket, Part No. QN718A

2. Model Number

Configuration of Model Number

I II III IV V 0 VI

Example: IP51VFD36FA07322

I	II	III	IV	V	VI	Contents		
Basic model No.	Input type	Output types	Power voltage	Additional processing	Temperature range specification			
IP51VFD						DC pulse converter		
IP51VFS						DC pulse converter with dropout function		
Selected from Table 1. ▶						—		
						One shot non-contact output		
						Open collector output	Selected by DIP switch	
						Voltage pulse output		
						A	100 to 120V AC 50/60Hz common	
						D	24V DC	
						0	None	
						T	With tropicalization	
						D	With test data	
						B	With tropicalization and test data	
Y	Traceability prover compatibility product							
Selected from Table 2. ▶						—		

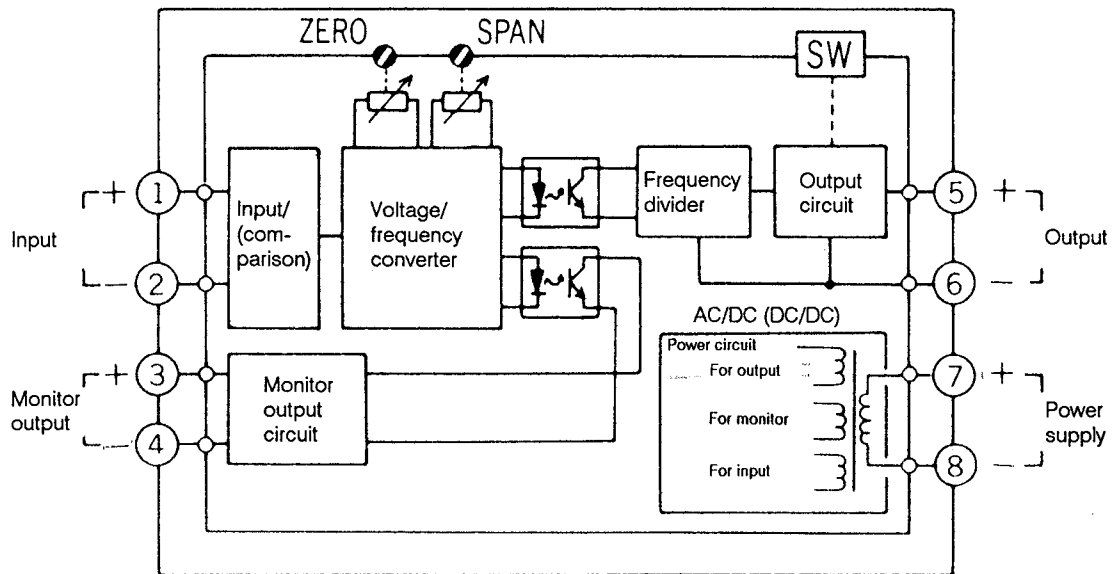
Table 1. Input Type

Additional type No.	Input type	Input impedance
10	0 – 10mV	1 MΩ
11	0 – 100mV	1 MΩ
12	0 – 1V	1 MΩ
13	0 – 5V	1 MΩ
14	1 – 5V	1 MΩ
15	0 – 10V	1 MΩ
16	0 – 50mV	1 MΩ
17	0 – 60mV	1 MΩ
30	0 – 10μA	1 kΩ
31	0 – 100μA	100 Ω
32	0 – 1mA	100 Ω
33	0 – 10mA	50 Ω
34	0 – 16mA	50 Ω
35	0 – 20mA	50 Ω
36	4 – 20mA	50 Ω

Table 2. Specification of Output Range

A		Specification of pulse frequency (unit: Hz)	
Type No.	Multiplier		
1	$\times 10$		Multiplier of range's upper limit value: Selected from Column A Significant digits of range's upper limit value: 3 digits
2	$\times 100$		
3	$\times 1000$	Example	
4	$\times 10^4$	(1) 0Hz to 73.2kHz 0Hz to 73200Hz 0Hz to 732×100	(2) 0Hz to 96.3Hz 0Hz to 963×0.1
5	$\times 10^5$		
8	$\times 1$	Specification of the unit of count/min or count/hr	
9	$\times 0.1$		Multiplier of range's upper limit value: Selected from Column A Significant digits of range's upper limit value: 2 digits Unit: M (count/min) H (count/hr)
G	$\times 0.01$		
H	$\times 10^{-3}$	Example	
J	$\times 10^{-4}$	(1) 0 to 3000 pulses/min 0 to 30×100 pulses/min	(2) 0 200000 pulses/hr 0 to 20×10^4
—	—		

3. Circuit Block Diagram

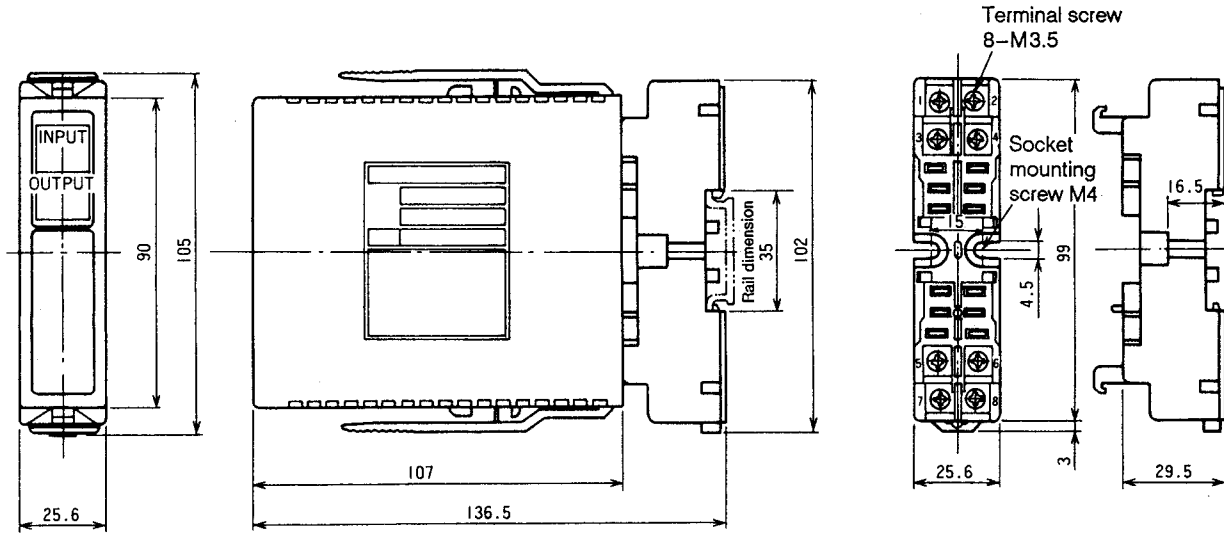


4. Dimensions

External Dimensions

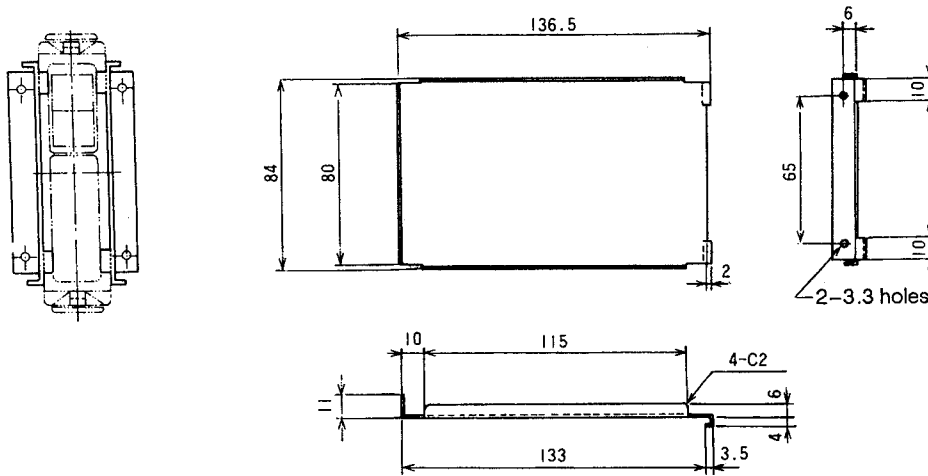
Unit: mm

Base socket Part No. QN719A



With the Vibration-Absorbing Bracket Mounted

Vibration-absorbing bracket Part No. QN718A



Material: Cold-rolled steel plate SPCC t1
Galvanized, and chrome processed

5. Installation

1. CAUTIONS IN INSTALLATION

(1) Handling

When removing or mounting the main unit from/to the socket, be sure to turn OFF the power supply and the input signal in advance to prevent trouble from occurring.

(2) Installation

(a) When the equipment is to be installed in a place subject to excessive dust or chips, house it in a dust-proof cabinet, which has a heat radiation function.

(b) Avoid exposing the equipment to vibration and shocks as much as possible, since they may cause a malfunction.

(3) Wiring

(a) Don't lay the power line, input signal line, and output signal line near a noise generator, or relay drive line.

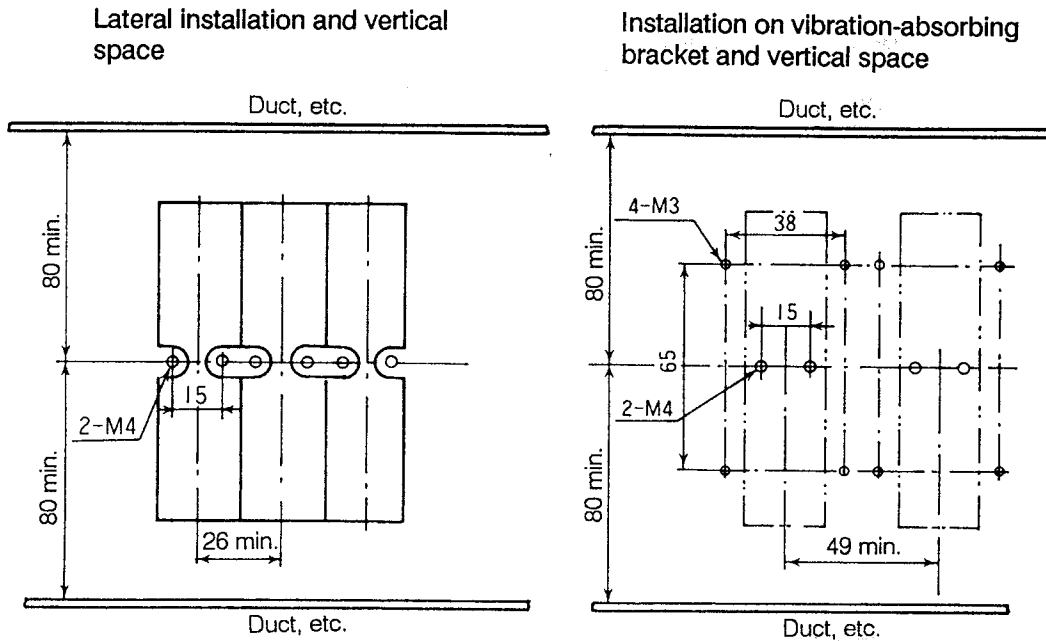
(b) Avoid clamping these lines together with a noise superimposed line or putting them together in the same duct.

(c) This equipment can be operated as soon as the power supply is turned ON. However, for optimum performance, allow 30 min. of energizing time before operating.

(4) Short circuit of output terminals

In the case of the voltage output, avoid shorting the output terminals for a long time.

2. INSTALLATION METHOD



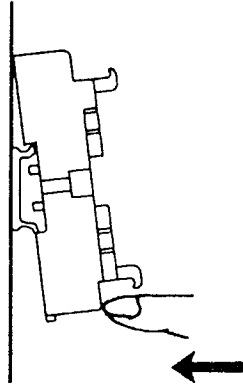
Cautions

- ① When installing the equipment on the wall subject to vibration, use the vibration-absorbing bracket (option, QN718A). Where there is vibration, the equipment cannot be installed on the DIN rail.
- ② When the output of the main unit is to be A/D converted, use the integral type A/D converter. When the high speed A/D converter for sequential comparison, etc. is to be used, check the operation by the combination test in advance.

3. MOUNTING AND REMOVING TO/FROM THE DIN RAIL

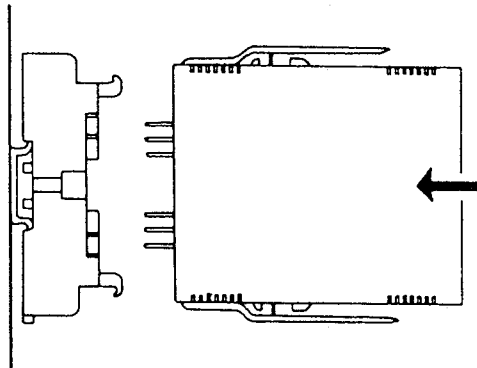
(1) How to fix the socket

Hook the click to the rail with the slider on the socket bottom-down, and push in the lower part of the socket in the direction of the arrow, as shown in the figure, until it is fixed.



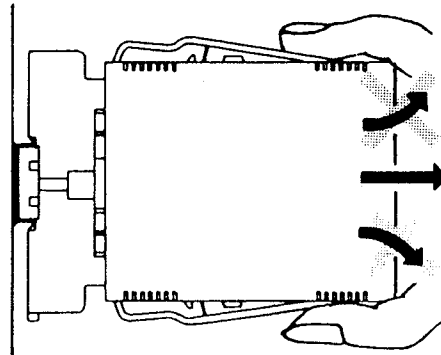
(2) How to fix the main unit to the socket

Set the main unit so that the label can be properly read, and insert it straight and even. At this time, insert it until the hooks are restored parallel with the main unit case, and they are completely engaged with the projection of the socket.



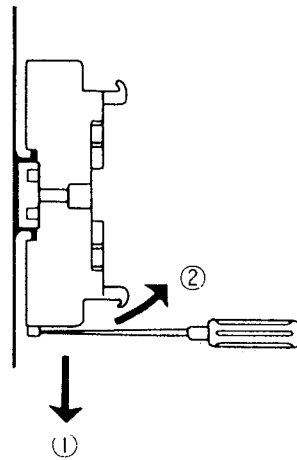
(3) How to remove the main unit from the socket

Push in the main unit sufficiently, and spread the upper and lower hooks simultaneously, and then extract the main unit forward, straight and even. Note that the socket may be damaged if it is extracted without spreading both hooks sufficiently.

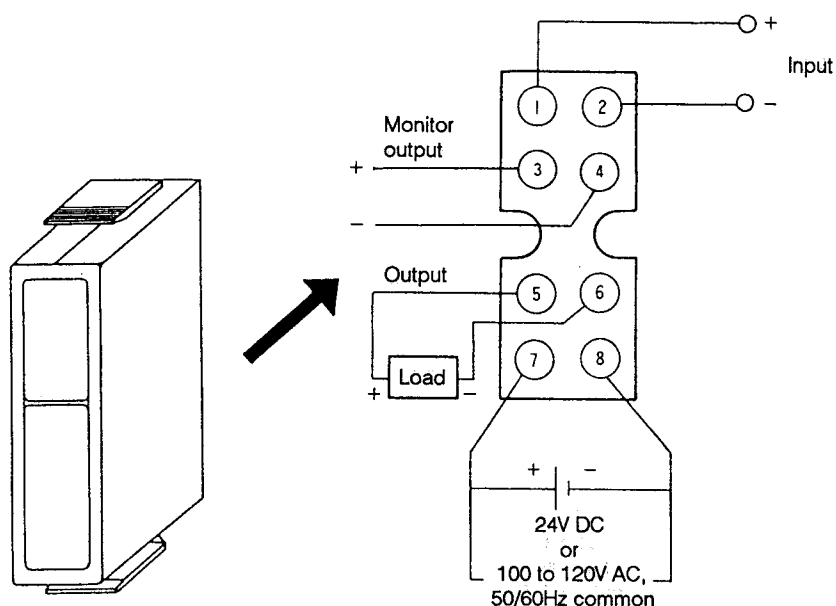


(4) How to remove the socket

Insert the screwdriver in the groove of the socket. While pulling the screwdriver in the direction of the arrow as shown in the diagram, draw the lower part of the socket forward until it is removed.



6. Wiring



1. WIRING

1-1 Power Supply

Connect the power supply of the voltage indicated on the label to terminals 7 and 8. With the DC power supply model, connect the (+) side of 24V to No. 7 terminal, and the (-) side to No. 8 terminal.

1-2 Input

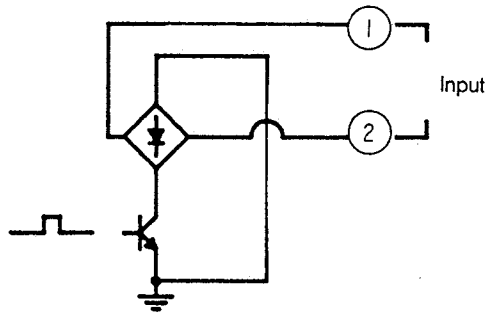
Connect the DC signal indicated on the label to No. 1 (+) and No. 2 (-). The impedance of the input circuit is 1M Ω or more with the voltage input, or is as shown in the table below with the current input.

Input current (A)	10 μ A	100 μ	1m	10m	16m	20m	4 - 20mA
Input resistance (Ω)	1k	100	100	50	50	50	50

1-3 Output

a) E type output

This is used to drive the DC or AC electromagnetic counter. Set the applied voltage to 200V DC or 130V AC or less, and the drive current I_L to 500mA or less. The conduction time is approx. 100 msec and it is always constant. Keep the output frequency always at approx. 5Hz or less.



b) F type output

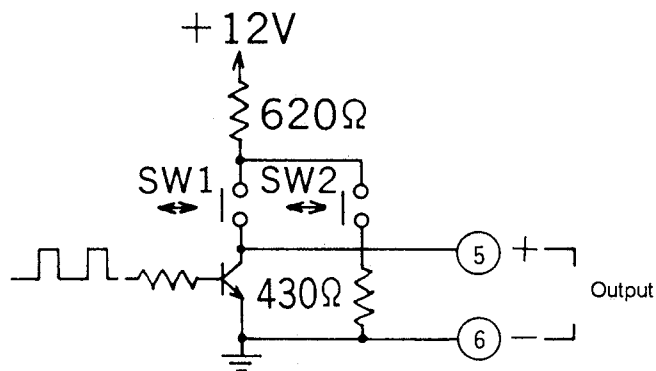
This is an output circuit which is suitable for the open collector or the voltage pulse output of 5V/12V.

Set the DIP switches SW1 and SW2 mounted on the left side of the case to the desired output.

1	ON	Voltage output
	OFF	Open collector output
2	ON	5V output
	OFF	12V output

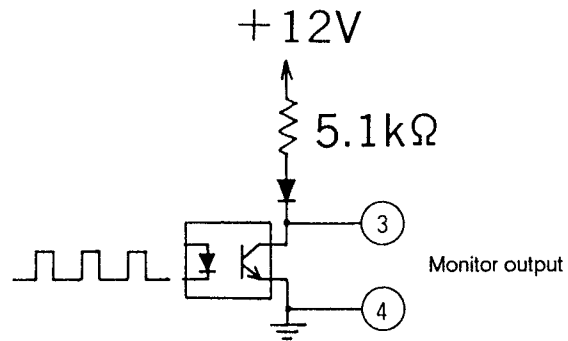
The DIP switch SW-1 is used to select either the open collector output or voltage pulse output. The voltage pulse can be selected from 5V and 12V. When SW-1 is turned OFF, the output corresponding to the open collector can be obtained. Use the ON current at 30mA or less, and the circuit voltage at 30V or less. The output voltage at the ON time is max. 0.4V.

When SW-1 is turned ON, the voltage pulse output is obtained. When SW-2 is turned ON, the output is 5V; when turned OFF, it is 12V. Since the output is delivered through the resistor of 620Ω as shown in the figure below, the output level is reduced due to voltage division when the load resistance is smaller.



7. Adjustment

Although the signal converter has been correctly adjusted at time of shipping, carry out the calibration for the performance changed with time or for fine adjustment of the rating in the following manner.



Connect a frequency counter to terminals 3 and 4. Connect a DC signal generator to the input, and turn the ZERO adjusting variable resistor until the monitor output frequency is 1/100 of the value indicated in the MONI column of the label at right.

With the VFS type with standard specifications, however, apply the input of 10% of the rating, and make the zero adjustment until the monitor output reaches 10%. Next, turn the SPAN adjusting variable resistor until the monitor output frequency reaches the value indicated in MONI when the rated input signal is applied. When the monitor output is the indicated value, the output frequency becomes the value indicated on the label.

If the output frequency is faster, connect a frequency counter directly to the output terminals ⑤ and ⑥. The adjustable range is $\pm 10\%$ FS in span, and $\pm 10\%$ FS in zero, approximately.

Specifications are subject to change without notice.

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