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# IntellpaK

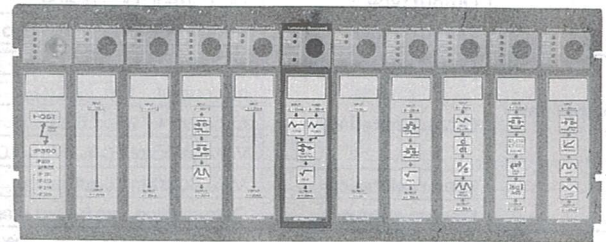
## Two-input Calculation Unit

### IP326

The IntellpaK IP326 is a microprocessor based two-input calculation unit which receives two linear input signals of DC current, or DC voltage, processes them and outputs the converted DC current or DC voltage signal. Calculation functions are set using the Handy Loader QN715A.

#### Features

- Response time of 300ms, and accuracy as high as  $\pm 0.15\%FS$ .
- Both input range and output range permit scaling to be executed in the multi-range system.
- Up to four types of calculations can be selectively set.
- The input and output are isolated from each other.
- Remote switch input, and self-diagnostics, etc. are provided as standard.
- A communication function can be added.



#### Specifications

Input part	<b>No. of inputs</b>	2 inputs (input 1, input 2)				
	<b>Input type</b>	DC current, DC voltage See Table 1 (page 3).				
	<b>Input sampling cycle</b>	100ms (TYP)				
	<b>Input digital filter</b>	First-order lag filter system: 0.0 to 99.9sec variable (filter off at 0.0)				
	<b>Input bias current</b>	mV input: $-0.15\mu A$ to $+0.15\mu A$				
	<b>Input impedance</b>	mA input: Max. $30\Omega$ Voltage input (V): Min $500k\Omega$				
	<b>Allowable wiring resistance</b>	mV input: Max. $250\Omega$				
	<b>Isolation</b>	The input 1 and 2 are not isolated from each other, but the input 1/2 and output are isolated from each other.				
	<b>Remote switch input (RSW)</b>	<b>Function</b>	Signal source for various calculations requiring DI. Operation object is specified by the Handy Loader QN715A101.			
		<b>Input mode</b>	With contact provided, or no voltage semi-conductor contact.			
<b>Input time</b>		ON or OFF held for a min. of 100ms.				
<b>Input contact capacity</b>		20V DC, 10mA min.				
<b>Isolation</b>		Not isolated between the remote switch input and output.				
Calculation part	<b>Type of setting</b>	Up to four types in total can be arbitrarily selected; three types from the groups A, B and M, and one type from the group C.				
	<b>Setting range</b>	See Table 3 (page 4 to 7)				
	<b>Setting sequence</b>	The group M is set first, followed by group A (necessary condition).				
	<b>Calculation types</b>		<b>Group A</b>	<b>Group B</b>	<b>Group C</b>	<b>Group M</b> Note (1)
			No operation	First-order lag filter	High-low selector	Low monitor
			Reverse	Bias ratio	Switch selector	High monitor
			Analog memory	Scaling	Change point selector	Deviation monitor
			Preset	Square root extraction	Soft switch selector	Arrival monitor
			—	High-low limiter	Temperature correction	Timer monitor (low)
			—	Change rate limiter	Pressure correction 1 ( $kgf/cm^2$ )	Timer monitor (high)
			—	Derivative	Pressure correction 2 ( $mmH_2O$ )	Keeping monitor (low)
			—	Lead, lag	Addition and subtraction	Keeping monitor (high)
			—	Absolute value	Multiplication	Keeping monitor (deviation)
			—	Linearize table	Division	Keeping monitor (arrival)
		—	Maximum value keeping		Change rate monitor	
	—	Minimum value keeping		—		
	—	Soft preset		—		
Note (1): The external contact output is connected with the M group monitor by the handy loader QN715A101.						

Calculation part	Calculation pattern	Pattern type	6 types: One type selected.	
		Application	Asterisk (*) function: Applied only to group C. No mark function: Applied to group A, B and M.	
		Input 1	$F_1^* \rightarrow F_2 \rightarrow F_3 \rightarrow F_4 \rightarrow \text{Output}$	Input 1 $\rightarrow F_1 \rightarrow F_2 \rightarrow F_3^* \rightarrow F_4 \rightarrow \text{Output}$
		Input 2	Pattern No. 1	Pattern No. 4
		Input 1	$F_1 \rightarrow F_2^* \rightarrow F_3 \rightarrow F_4 \rightarrow \text{Output}$	Input 1 $\rightarrow F_1 \rightarrow F_2 \rightarrow F_3 \rightarrow F_4^* \rightarrow \text{Output}$
Input 2	Pattern No. 2	Pattern No. 5		
Input 1	$F_1 \rightarrow F_2 \rightarrow F_3^* \rightarrow F_4 \rightarrow \text{Output}$	Input 1 $\rightarrow F_1 \rightarrow F_2 \rightarrow F_3 \rightarrow F_4^* \rightarrow \text{Output}$		
Input 2	Pattern No. 3	Pattern No. 6		
Output part	Output type	DC current, DC voltage See Table 2 (page 3).		
	Output range	Range including 0mA: 0 to 110%FS Range not including 0mA: -10 to 100%FS		
	Output update cycle	100ms (TYP)		
	Output impedance	mA output: Min. 500k $\Omega$		
		mV output: Max. 60 $\Omega$		
		Voltage output (V): Max. 10 $\Omega$		
Load resistance	Max. 600 $\Omega$ in 20mA range			
Manual output	Output value can be set irrespective of input by the Handy Loader QN716A101: -10.0 to 110.0%			
Self-diagnostics	Input underrange check	If PV input is less than -10% calculation is performed with the PV input set to -10%. Alarm is triggered.		
	Input overrange check	If PV input is more than 110%, calculation is performed with the PV input set to 110%. Alarm is triggered.		
	EEPROM adjustment area sum check	EEPROM adjustment area is sum checked only when power supply is turned ON.		
	EEPROM user area sum check	EEPROM user area is sum checked during normal operation. Minimum time for error detection is 13sec.		
	Error indication	OPR/ALM LED blinks at 0.5sec intervals when an error is detected.		
	Error type	Readable using the Handy Loader QN715A101.		
Optional functions	Communication	Connected to the mother board within the communication system 11ch rack (QN715A101) where the communication module (IP390A) is mounted.		
		For details, see Catalog No. CP-SS-1411.		
General specifications	Accuracy	$\pm 0.15\%$ FS See Table 2 (page 3).		
	Response time	300ms (TYP). 95% response to step input.		
	Power supply type	AC	DC	
	Rated power voltage	100 to 240V, 50/60Hz	24 to 48V DC	
	Power voltage	90 to 264V AC, 50/60Hz	20 to 56V DC	
	Power consumption	Max. 12VA Max. 12VA	Max. 12V	
	Starting current	—	Max. 0.5A	
	Peak power current value and width when turning on power supply	20A, 2ms	20A, 0.2ms	
	Insulation resistance	Min. 50M $\Omega$ between each terminal and case, and between primary and secondary terminals by using a 500V DC megger.		
	Dielectric strength	1500V AC, 1 min or 1800V AC, 1 sec between primary terminal and case, and between primary and secondary terminals.		
		500V AC, 1 min or 600V AC, 1 sec between secondary terminal and case.		
		1000V AC, 1 min or 1200V AC, 1 sec between input and output		
	Temperature characteristics	For standard range : $\pm 0.18\%$ FS, $\pm 7\mu\text{V}$ or $\pm 3.3\mu\text{V}$ , whichever is larger (by an input conversion value per 10°C of ambient temperature).		
		For intermediate range : Standard range $\times 1.2$ , $\pm 57\mu\text{V}$ or $\pm 33\mu\text{A}$ , whichever is larger (by an input conversion value per 10°C ambient temperature).		
	Allowable ambient temperature	0 to 50°C		
	Storage temperature	-20 to +70°C		
	Allowable ambient humidity	Max. 90%RH at 40°C No dewing		
	Vibration resistance	Max. 4.9m/s <sup>2</sup> , 10 to 60Hz, XYZ directions, 2 hours	Excluding DIN rail mounted type.	
	Impact resistance	Max. 490m/s <sup>2</sup> , three times in vertical direction		
	Case material	Polycarbonate		
Case color	Gray, Munsell 2.5PB3.5/1			
Wiring terminal screw	M3.5			
Insertion life of Handy Loader jack	Max. 1000 times (with the Handy Loader cord incorporated)			
Mounting	Rack mount			
	Wall mount: Vibration-absorbing bracket (Part No. 81404080-001) is used where there is wall vibration.			
	DIN rail mount: Not possible where there is vibration or shock.			
Weight	Approx. 0.6kg			

Attachments	Name of Article	Part No.	Q'ty	Options	Name of Article	Model	Weight (approximately)
	Mounting brackets	81403255-101	1 set		5ch rack (non-communication system)	QN717A101	2.6kg
	Vibration-absorbing bracket	81404080-001	1 set		11ch rack (communication system)	QN716A101	1.6kg
	Various labels	N-3218	1 set		Blind cover for rack	81403291-001	10g
	Test data	—	1 copy		Handy Loader *	QN715A101	400g
	Instruction manual	—	1 copy		Handy Loader case	81403304-001	74g
	—	—	—		Curled cord for Handy Loader	81403280-001	210g

\* With connecting curled cord, output cable and leather case provided.

Model Configuration Table

I II III IV V VI VII

Ex.: IP326CC5A02T0

I	II	III	IV	V	VI	VII	Contents
Basic model	No. 1 Input range	No. 2 Input range	Output range	Power voltage	Optional function	Additional processing	
IP326							Two-input calculation unit
Selected from Table 1.	Selected from Table 1.	Selected from Table 2.					—
				A			100 to 240V DC, 50/60Hz
				D			24 to 48V DC
					00		None
					02		Communication
						00	None
						T0	Torrid zone processing

Table 1. Input Range

Range	Code	Indication, setting unit (on Handy Unit)	Range		Accuracy Note (1)		Note (1)
			Standard range (set at delivery time)	Maximum range (settable after delivery)	Maximum range	Intermediate range (maximum error)	
Current, voltage (linear)	C	mA	4 to 20mA	0 to 20mA	±0.15%FS	±0.030mA	<p>Note (1)</p> <ul style="list-style-type: none"> <li>In all cases, input conversion accuracy</li> <li>Reference conditions: Ambient temperature 23.5±1°C, Power voltage 105±2V AC or 24±0.5V DC</li> </ul> <p>Maximum error: The maximum error in an intermediate range (including the standard range) is an error which occurs when the relevant range is included within the maximum range.</p> <p>Example 1: When the intermediate range is 4 to 24mA, it is included within the standard range of 0 to 50mA. Therefore, the maximum error is ±0.75mA.</p> <p>Example 2: When the standard range is 4 to 20mA, it is included within the maximum range of 0 to 20mA. Therefore, the maximum error is ±0.030mA.</p>
	1	mA	10 to 50mA	0 to 50mA	±0.15%FS	±0.075mA	
	2	mA	2 to 10mA	0 to 10mA	±0.15%FS	±0.015mA	
	3	mA	0 to 1mA	0 to 1mA	±0.15%FS	±0.0015mA	
	4	V	0 to 10V	0 to 20V	±0.15%FS	±0.03V	
	5	mV	1 to 5V	0 to 5V	±0.15%FS	±7.5mV	
	6	mV	0 to 1V	0 to 1V	±0.15%FS	±1.5mV	
	7	V	-4 to +4V	-10 to +10V	±0.15%FS	±0.03V	
	8	mV	0 to 100mV	0 to 100mV	±0.15%FS	±0.15mV	
M	mV	0 to 10mV	-10 to +10mV	±0.15%FS	±0.03mV		

Table 2. Output Range

Range	Code	Indication, setting unit (on Handy Loader)	Range		Accuracy (Reference conditions: Ambient temperature 23.5±1°C, Power voltage 105±2V AC or 24±0.5V DC)	
			Standard range (set at delivery time)	Maximum range (settable after delivery)	Maximum range	Accuracy by scaling
Current, voltage (linear)	C	mA	4 to 20mA	0 to 20mA	±0.15%FS	<p>80% or more: ±0.15%FS</p> <p>Less than 80%: <math>\pm 0.15\%FS \times \frac{\text{Maximum output range width}}{\text{Intermediate output range width}}</math></p> <p>However, the input conversion value of ±5%FS, when scaling is within 0 to 1mA.</p> <p>Note: The accuracy is doubled where less than 0.5mA in the current output.</p>
	2	mA	2 to 10mA	0 to 10mA	±0.15%FS	
	5	V	1 to 5V	0 to 5V	±0.15%FS	
	8	mV	0 to 100mV	0 to 100mV	±0.15%FS	
	M	mV	0 to 10mV	0 to 10mV	±0.15%FS	