

<u>Home > Products > Programmable Logic Controllers - PLCs</u> > MicroSmart Pentra

MicroSmart Pentra

Overview

IDEC strives to give you the best product for your dollar, and our controllers are just that! Offering speed, power, performance and precision are just the tip of the iceberg. The true benefit to using an IDEC controller is that it will cut your development time in half. These reliable controllers are easy to use, easy to maintain and easy to repair. No boards to build and maintain. No approvals to get. No spare parts to worry about. Just a simple, ready-made solution that won't require time you don't have to give. Instead, count on saving time with faster response, better throughput, reduced waste and less downtime.



NEW 12VDC

Demand for 12VDC control voltage has grown as solar and vehicle applications gain popularity and require PLCs to match their power sources. With abundant features and unparallel performance, the new 12VDC MicroSmart Pentra is the perfect choice for solar applications, including traffic signs, light controls, road sign controls, remote pumping and injections systems for oil & gas industries, remote water pumping stations and solar tracking systems. For vehicle applications, 12VDC MicroSmart Pentra can be utilized in utilities vehicle such as cement mixer, lift controls for handicap, lighting and designation signs for van and buses.

Key Features

- Fast processing speed
- Support 32-bit data and floating point match
- 16-bit analog resolution
- Built-in Modbus RTU, ASCII and TCP/IP
- Field Upgradeable Firmware
- Up to 512 I/Os
- Configure up to 56 Analog I/Os
- Max. of 7 Communication Ports
- Embedded 100kHz high speed I/O
- Online Edit and Simulation Mode

Highlights of MicroSmart Controllers

Global Standards

All MicroSmart controllers have regulatory agency certifications for the worldwide market including: cULus Listed for Class I Division 2 hazardous locations, CE compliant, and certified for marine use by Lloyd's Registry.

Compatibility

For added convenience, the same expansion I/O modules and accessories can be used on both the MicroSmart and MicroSmart Pentra controllers. In fact, both controllers also share the same architecture, instruction set and programming software. The use of a single platform for all IDEC

PLCs means you won't have to reprogram or learn a new system to alternate from one to another.

Simple Programming

Relax. Programming doesn't need to be hard or take a lot of your time. With IDEC WindLDR Software, you can configure, modify and monitor your MicroSmart programs with ease. This powerful and intuitive software makes it simple to get your system up and running. Now supporting Online Editing and Simulation mode.

Compact and Modular Design

Every CPU module comes equipped with embedded I/O points or you can conveniently add additional snap-on expansion modules for up to 512 I/Os based on your system requirements. All IDEC controllers are DIN-rail and panel mountable.

Customizable Structure

Feel the freedom. The ability to customize for the functions you need allows you to create the perfect system for your applications. Add an HMI module, a Real Time clock module or even an optional EEPROM module.

MicroSmart Pentra Series

FC5A-C16R2

[MicroSmart Pentra the fastest MicroPLC in its class! Available in either Slim/Book Style and All-In-One type]





Product Specifications

PLC Product Category	CPU Unit
Operating Voltage	120V AC, 240V AC
High Speed Counter(s)	50kHz, 5kHz
High Speed Counter Input Type	Sink, Source
RS485 Ports	1, Separate Module Required
On Board Communication Port	1 RS-232
Memory Card Slot	Yes
On Board Input Type	Transistor Sink, Transitor Source
On Board Output Type	Relay
I/O Expandable	No
Maximum I/O	16
On Board I/O	9/7
Real Time Clock	Yes, Separate Module Required
Connector Type	Screw Terminal
Notes	MicroSmart All-in-One Brick Style PLC. See catalog pages for further information.
I/O Range Requirement	24 or less
Floating Point Math	Yes
Data Processing	32 Bit
Max. Communication Ports	1, 2

All-in-One						
Appearance	Part Number	Power	I/O Points	Input	Output	Expandability
	FC5A-C10R2C	24V DC	- 10 (6 in /1 out)		Relay	
	FC5A-C10R2	100-240V AC	- 10 (6 in/4 out)			N1/A
	FC5A-C16R2C	24V DC	16 (9 in/7 out)			N/A
	FC5A-C16R2	100-240V AC		24V DC (Sink/Source)		
	FC5A-C24R2C	24V DC			-	
	FC5A-C24R2	100-240V AC	24 (14 in/10 out)	but)		4 expansion modules)

MicroSmart Pentra CPU Part Numbers

Slim

Appearance	Part Number	Power	I/O Points	Input	Output	Expandability	
	FC5A-D16RK1		10 (0 in (0 aut)		6 Relays, 2 Transistor Sink	496 Maximum I/O	
- Thermore	FC5A-D16RS1	16 (8 in/8 out)			6 Relays, 2 Transistor Source	(up to 15 expansion modules)	
	FC5A-D32K3*	24V DC	32 (16 in/16 out)	24V DC (Sink/Source)	Transistor Sink	512 Maximum I/O	
II.	FC5A-D32S3*				Transistor Source	(up to 15 expansion modules)	



 $\ensuremath{^*\text{See}}$ page 20 for MIL Connector Cables and Breakout Modules.

All-in-One

Specifications

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Part Number	AC Power	FC5A-C10R2	FC5A-C16R2	FC5A-C24R2	FC4A-C10R2	FC4A-C16R2	FC4A-C24R2		
	DC Power	FC5A-C10R2C	FC5A-C16R2C	FC5A-C24R2C	FC4A-C10R2C	FC4A-C16R2C	FC4A-C24R2C		
Rated Voltage		AC power model: 100 to 240V AC, DC power model: 24V DC							
Allowable Voltage Rar	nge		AC power model: 8	35 to 264V AC, DC powe	r model: 20.4 to 28.8V I	DC (including ripple)			
Rated Power Frequence	ÿ			AC power model: 50)/60 Hz (47 to 63 Hz)				
Maximum Input Currer	nt	250mA (85V AC) 160mA (24V DC)	300mA (85V AC) 190mA (24V DC)	450mA (85V AC) ¹ 360mA (24V DC) ²	250mA (85V AC) 160mA (24V DC)	300mA (85V AC) 190mA (24V DC)	450mA (85V AC) ² 360mA (24V DC) ³		
Maximum Power	AC Power		FC5A-C	:10R2/FC4A-C10R2: 30V 16R2/FC4A-C16R2: 31V/ :24R2/FC4A-C24R2: 40V	A (264 V AC) / 22VA (10	0V AC) 3			
Consumption	DC Power			FC5A-C10R2C/FC4A-C FC5A-C16R2C/FC4A-C FC5A-C24R2C/FC4A-C	6R2C: 4.6W (24V DC) 4				
Allowable Momentary Power Interruption				10ms (rated p	ower voltage)				
Dielectric Strength			Betwe Betw	en power and⊕ or ఉ veen I/O and⊕ or ఉ te	terminals: 1500V AC, 1 rminals: 1500V AC, 1 m	minute ninute			
Insulation Resistance				er and ⊕ or ∉ termina and ⊕ or ∉ terminals					
Noise Resistance			۱/		: 1.5 kV, 50 ns to 1µs : 1.0 kV, 50 ns to 1µs amp): 1.5 kV, 50 ns to 1	μs			
Inrush Current		:	35A	40A	3	85A	40A		
Power Supply Wire				UL1015 AWG22	UL1007 AWG18				
Operating Temperature	e			0 to	55°C				
Storage Temperature				–25 to +70°C	(no freezing)				
Relative Humidity			Leve	el RH1 (IEC61131-2), 1 to	o 95% RH (no condensa	ation)			
Altitude				Operation: 0 to 2,000m	, Transport: 0 to 3,000m	1			
Pollution Degree					0664-1)				
Corrosion Immunity				Free from co	rrosive gases				
Degree of Protection				IP20 (IE					
Grounding Wire				-	AWG16				
Vibration Resistance		When mounted on a DIN rail or panel surface: 5 to 9 Hz amplitude 3.5 mm, 9 to 150 Hz acceleration 9.8 m/s ² (1G), 2 hours per axis on each of three mutually perpendicular axes (IEC61131-2)							
Shock Resistance		14	17 m/s² (15G), 11ms dur	ation, 3 shocks per axis	on three mutually perp	pendicular axes (IEC61	131)		
Weight		AC: 230g DC: 240g	AC: 250g DC: 260g	AC: 305g DC: 310g	AC: 230g DC: 240g	AC: 250g DC: 260g	AC: 305g DC: 310g		

CPU module (including 250mA sensor power) + 4 I/O modules
 CPU module + 4 I/O modules
 CPU module (including 250mA sensor power)
 CPU module (24V DC)

All-in-One

MicroSmart Series

Programmable Logic Controllers

PLCs

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Part Nur	nber		FC5A-C10R2 FC5A-C10R2C	FC5A-C16R2 FC5A-C16R2C	FC5A-C24R2 FC5A-C24R20	;	FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C
Control S	ystem		Stored program system						
antructio	on Words					35 ba	asic		
Istructio	n vvorus		76 advanced	76 advanced	81 advanced		38 advanced	40 advanced	46 advanced
rogram	Capacity	1	13.8 KB (2,300 steps)	27 KB (4,500 steps)	54 KB (9,000 s	teps)	4.8 KB (800 steps)	15 KB (2,500 steps)	27 KB (4,500 step
Jser Prog	gram Stor	rage			EEPROM (1	0,000 t	imes rewritable)		
rocessin	ng	Basic Instruction		1.16ms (1,000 steps)				1.65ms (1,000 steps	s)
ime		END Processing ²	0.64ms				0.64ms		
xpandab	ole I/O M	odule	—		4 modules		—		4 modules
(O Daint		Input	6	9	14 Expans	sion:	6	9	14 Expa
/O Points	S	Output	4	7	10 64		4	7	10 sion
nternal F	Relay			2,048 points			256 points	1,02	4 points
hift Reg	ister			128 points			64 points	128	3 points
ata Reg				2,000 points			400 points	1.30	10 points
0	a Registe	or							
	a nogiste			256 points			22 points	4.00	
ounter	000 100	mo 10 mo 1 m-1		256 points			32 points) points
inner (1-s		ms, 10-ms, 1-ms)		256 points	ornal rates at 10	****	32 points) points
	Backup						er, counter, data regist		
		p Duration		Approx. 30			fter backup battery ful	ly charged	
dr	Batter						dary battery		
RAM Backup	-	ing Time		Approx.	15 hours for cha	0 0	rom 0% to 90% of full	charge	
Ŋ	Batter					5 yea			
2	Replac	reahility	N/A						
-		Joubinty							
	nostic Fu	,	Power failure, watchdog						
Self-diag	nostic Fu	,		data, user program syn	tax, user program	n writi	ng, CPU module, clock	IC, I/O bus initialize, u	
Self-diag		,		data, user program syn	tax, user program ter or 3 to 15ms	n writi filter (s	ng, CPU module, clock selectable in incremen	IC, I/O bus initialize, u	
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Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.

3. Maintenance communication, user communication, Modem communication, datalink, Modbus master/slave communication (FC5A only). Note: The maximum number of relay outputs that can be turned on simultaneously is 33 including those on the CPU module.

Communication & Networking

Sensors

26

Communication Port (RS232C Port 1)

Model	Slim CPU	All-in-One CPU		
Standards	EIA	RS232C		
Maximum Baud Rate	FC5A: 57,600 bps (maintenance communication) FC4A: 19,200 bps (maintenance communication)			
Maintenance Communication	Possible			
User Communication	Possible			
Modem Communication	N/A			
Data Link	N/A			
Cable	Special cable (FC2A-KC4C, FC2A-KP1C, FC4A-KC1C, FC4A-KC2C)			
Isolation between Internal Circuit and Communication Port	Not isolated			

Input Specifications

Part Number		-	FC5A-D16RK1 FC5A-D16RS1	-	FC5A-D32K3 FC5A-D32S3	-	FC5A-C10R2 FC5A-C10R2C	FC5A-C16R2 FC5A-C16R2C	FC5A-C24R2 FC5A-C24R2C
T unt Muniber		FC4A-D20K3 FC4A-D20S3	-	FC4A-D20RK1 FC4A-D20RS1	-	FC4A-D40K3 FC4A-D40S3	FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C
Input Points		12 (12/1 common)	8 (8/1 common)	12 (12/1 common)	16 (8/1 common)	24 (12/1 common)	6 (6/1 common)	9 (9/1 common)	14 (14/1 common)
Input Voltage					24V DC sink/sou	urce input signal			
Input Voltage	Range			20.4 to 26.4V DC			20.4 to 28.8V D	С	
Input Current		I2, I5, I10 t FC4A I0, I1, I6, I7		t (24V DC) t (24V DC)			FC4A IO and I1:	10 to I15: 7mA/	
Input Impedar	nce	I2 to FC4A I0, I1	, 13, 14, 16, 17: 15, 110 to 117: , 16, 17: 15, 110 to 117:	4.9kΩ 3.4kΩ 5.7kΩ 3.4kΩ			I2 t FC4A I0 a	and 11: to 17, 110 to 115: and 11: to 17, 110 to 115:	3.7kΩ 3.4kΩ 2.1kΩ 3.4kΩ
Turn ON Time		I2 and I5: I10 to I17:	FC5A I0, I1, I3, I4, I6, I7: 5µs + filter value I2 and I5: 35µs + filter value I10 to I17: 40µs + filter value FC4A I0, I1, I6, I7: 35µs + filter value I2 to I5: 35µs + filter value				FC5A IO and I1: I2 to I7: I6, I7, I10 FC4A IO and I1: I2 to I5: I6, I7, I10	35µs + to 115: 40µs + 35µs + 35µs +	filter value filter value filter value filter value filter value filter value filter value
Turn OFF Time		FC5A IO, I1, I3, I4, I6, I7: 5µs + filter value I2 and I5: 150µs + filter value I10 to I17: 150µs + filter value FC4A I0, I1, I6, I7: 45µs + filter value I2 to I5: 150µs + filter value I10 to 127: 150µs + filter value					FC5A IO and I1: I2 to I7: I6, I7, I10 FC4A IO and I1: I2 to I5: I6, I7, I10	150µs to 115: 150µs 45µs + 150µs	filter value + filter value + filter value filter value + filter value + filter value
Connector	On Mother Board	FL26A2MA (Oki Electric Cable)	MC1.5/18-G-3.81 (Phoenix Contact)		FL26A2MA (Oki Electric Cal	ble)	_		
	Insertion Durability		·	100 times minimum			—		
Isolation		Between input terminals: Photocoupler isolated Internal circuit: Not isolated							
Input					Type 1 (IEC	C61131-2)			
External Load Interconnectio	- / -				Not ne	eeded			
Single Determ	nination Method				Sta	atic			
Effect of Impr Connection	oper Input		If any	Both sinking input exceeding th		out signals can be o oplied, permanent		aused.	
Cable Length				3 m in c	compliance with e	lectromagnetic im	munity		

Sensors

Programmable Logic Controllers

-		—	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32 FC5A-D32		
Part Num	ber	FC4A-D20RK1 FC4A-D20RS1	_	FC4A-D40F FC4A-D40S		
Output Poi	ints	2 (2/1 com- mon)	2 (2/1 com- mon)	16 (8/1 com mon)		
Output	Transistor Sink		C5A-D16K1/D32K -D20K3/D20RK1/[
output	Transistor Source		C5A-D16RS1/D323 -D20S3/D20RS1/E			
Load Volta	ige		24V DC			
Operating	Load Voltage Range		20.4 to 28.8V DC			
Load Curre	ent	0	.3A per output poi	nt		
Maximum	Load Current		1A per common			
Voltage Dr	rop (ON Voltage)		voltage between C nals when output			
Inrush Cur	rent		1A			
Leakage C	urrent	0.1mA maximum				
Clamping	Voltage	39V±1V				
Maximum	Lamp Load	8W				
Inductive l	₋oad	L/R = 10ms (28.8V DC, 1 Hz)				
External C	urrent Draw	Sink output: 100mA maximum, 24V DC (power voltage at the +V terminal) Source output: 100mA maximum, 24V DC (power voltage at the –V terminal)				
Isolation		Between output terminal and internal circuit Photocoupler isolated Between output terminals: Not isolated				
Connector	on Mother Board	FL26A2MA (Oki Electric Cable)	MC1.5/16-G- 3.81BK (Phoenix Contact)	FL26A2MA (Oki Electric Cable)		
Connector Removal D	Insertion/ Durability	100 times minimum				
Output	Turn ON Time	Q3 to Q7, FC4A Q0, Q1: 5	FC5A Q0 to Q2: 5µs max. Q3 to Q7, Q10 to Q17: 300µs max. FC4A Q0, Q1: 5µs max. Q2 to Q7, Q10 to Q17: 300µs max.			
Delay	Turn OFF Time	Q3 to Q7, FC4A Q0, Q1:	02 to 07, 010 to 017: 300µs max. FC5A 00 to 02: 5µs max. 03 to 07, 010 to 017: 300µs max.			

Relay Output							
Dort Numb		FC5A-C10R2 FC5A-C10R2C	FC5A-C16R2 FC5A-C16R2C	FC5A-C24R2 FC5A-C24R2C	FC5A-D16RK1 FC5A-D16RS1		
Part Number		FC4A-C10R2 FC4A-C16R2 FC4A-C24R2 FC4A-C10R2C FC4A-C16R2C FC4A-C24R2C		FC4A-D20RK1 FC4A-D20RS1			
No. of Outp	uts	4	7	10	8		
Output Points per	COMO	3	4	4	2 (Transistor output)		
Common	COM1	1	2	4	3		
Line	COM2	—	1	1	2		
	COM3	—	—	1	1		
Output		1 NO form A					
Maximum L Current	oad	2A per point 8A per common line					
Minimum S [.] Load	witching	0.1mA/0.1V DC (reference value)					
Initial Conta Resistance	act	30 mΩ maximum					
Electrical Li	fe	100,000 operations minimum (rated load 1,800 operations/hour)					
Mechanical	Life	20,000,000 operations minimum (no load 18,000 operations/hour)					
Rated Load		240V AC/2A (resistive load, inductive load cos ø = 0.4) 30V DC/2A (resistive load, inductive load L/R =7ms)					
Dielectric S	trength	Between output and ఉ terminals: 1,500V AC, 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute					
Connector o Mother Boa		*					
Connector Insertion/Removal Durability		100 times minimum					
*MC1.	5/16-G-3.8	1BK (Phoenix Contac	t)				

PLCs

MicroSmart Series

11.3

70.0

FC5A-EXM1S

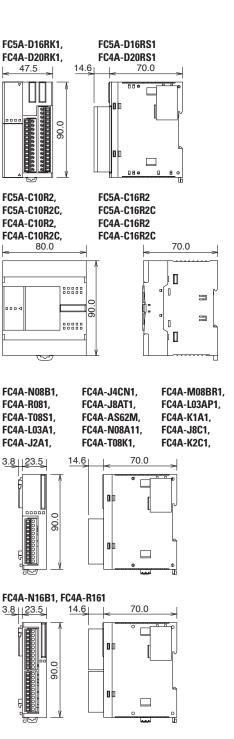
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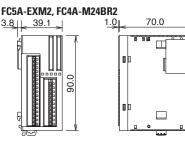
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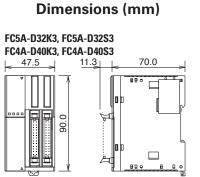
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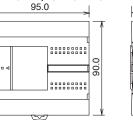
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FC5A-C24R2, FC5A-C24R2C FC4A-C24R2, FC4A-C24R2C

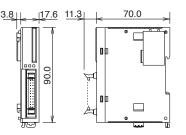


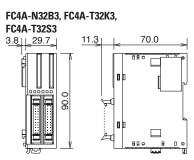


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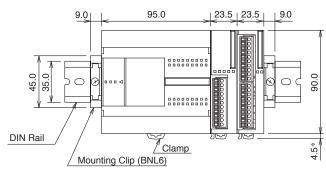
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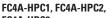
FC4A-EXM1M FC4A-N16B3, FC4A-T16K3, FC4A-T16S3

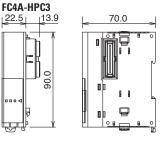


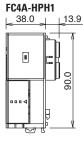


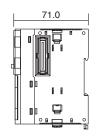






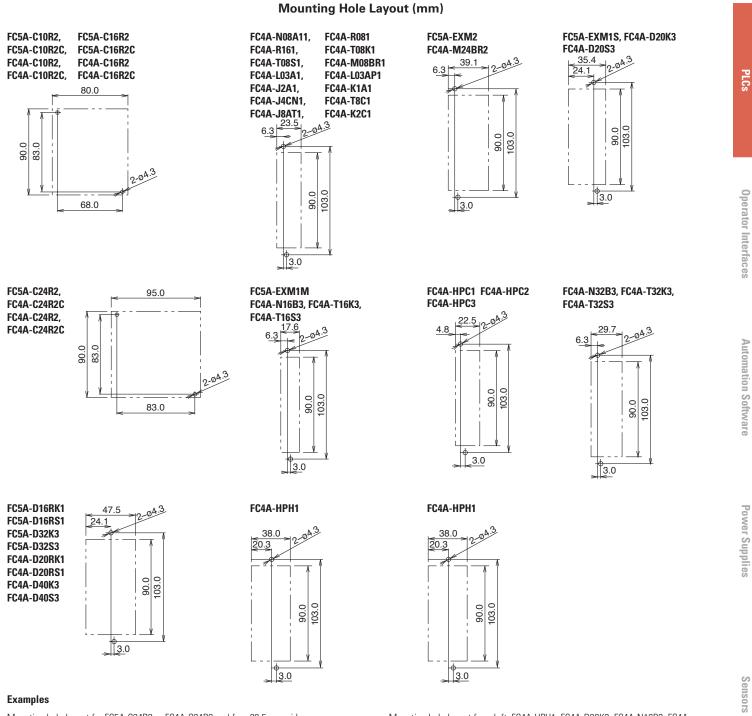




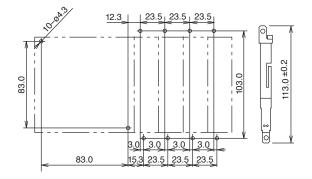


The figure illustrates a system setup consisting of the all-in-one 24-I/O CPU module, an 8-point relay output module, and a 16-point DC input module mounted on a 35mm-wide-DIN rail using BNL6 mounting clips.

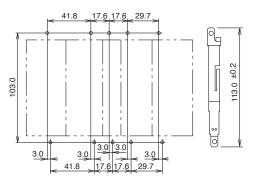
Programmable Logic Controllers



Mounting hole layout for FC5A-C24R2 or FC4A-C24R2 and four 23.5mm-wide $I/O\ modules$



Mounting hole layout from left, FC4A-HPH1, FC4A-D20K3, FC4A-N16B3, FC4A-N32B3, and FC4A-M24BR2 modules



43

Communication & Networking

Programmable Logic Controllers

General Specifications

Rated Power Voltage	24V DC
Allowable Voltage Range	20.4 to 26.4V DC
Current Draw	70 mA
Allowable Momentary Power Interruption	10 ms maximum
Dielectric Strength	500V AC, 1 minute
Insulation Resistance	10 $M\Omega$ minimum (500V DC megger)
Noise Resistance	DC power terminal: 1.0 kV, 50 ns to 1 µs Ethernet cable: 0.5 kV, 50 ns to 1 µs (coupling clamp)
Inrush Current	4A maximum
Operating Temperature	0 to 55°C
Storage Temperature	-40 to +70°C (no freezing)
Relative Humidity	10 to 95% (no condensation)
Pollution Degree	2 (IEC 60664-1)
Corrosion Immunity	Free from corrosive gases
Degree of Protection	IP20 (IEC60529)
Vibration Resistance	When mounted on a DIN rail: 5 to 9 Hz amplitude 3.5 mm 9 to 150 Hz accelaration 9.8 m/s ² (1G) 2 hours in each of 3 axes
Shock Resistance	147 m/s ² (15G), 11 ms duration 3 shocks each in 3 axes
Weight (approx.)	150g

nterface Speci	fications				
Communication	RS232C <=> Ethernet conversion function Electrical characteristics: Complies with IEEE802.3 Transmission speed: 10BASE-T/100BASE-TX (Not CE compliant) Communication protocol: IP/ICMP/ARP Ethernet protocol: TCP/SMTP/HTTP/Telnet No. of TCP connections: 1				
Ethernet Specifications					
Serial Interface Specifications	Electrical characteristics: EIA RS232C Transmission speed: 9600 to 115200 bps Synchronization: Asynchronous Communication protocol: Full duplex Transmission control: RTS/CTS, XON/OFF, None				
Connection Method	Ethernet interface: RJ45 Serial interface: Mini DIN 8-pin connector Cable Part No.: FC4A-KC3C				
Major Functions	Remote maintenance: Uploading, downloading and moni- toring using WindLDR via Ethernet				
	Web server: Configure the web server unit using Internet Explorer etc. Reading and writing PLC operands using Java applet. Web file area: 512 KB Compliant browser: Internet Explorer 6.0 or higher, Netscape Navigator 7.2				
	Ethernet user communication: User communication using Ethernet Message transmission: Registered outgoing message 32 message types, 63 characters maximum per message, 2 email addresses, 64 address characters maximum				
Optional	Utility CD: Configuration file, PLC operand monitor sample programs, sample program configuration instructions, instruction manual (English/German/Spanish/Japanese/ Chinese)				

Connectable Devices

Programmable Controllers	Operator Interfac
IDEC FC5A MicroSmart	(RS232C communic
IDEC FC4A MicroSmart	IDEC HG2F
IDEC FC3A OpenNet Controller	

e

cation with PLC through Ethernet)

Web Server Cable (FC4A-KC3C, Cable Length: 100 mm)





Cable Connection Diagram

Web Server

Connector for MicroSmart					Connector for Web Server Unit	
Pin No.	Port 1	Port 2		•	Pin No.	Name
1	NC	RS		+	1	DSR
2	NC	ER			2	CTS
3	SD			H.	3	SD
4	RD				4	RD
5	NC	DR			5	RTS
6	CMSW	SG			6	NC
7	SG	SG		$\backslash /$	7	GND
8	NC	NC	₩	_	8	DTR

Ethernet is a registered trademark of Xerox Corporation

Dimensions

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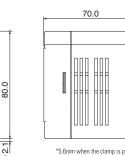
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Mounting Hole

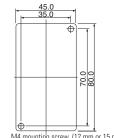
Mounting

Layout for Direct

0



*5.6mm when the clamp is pulled out



M4 mounting screw (12 mm or 15 mm)