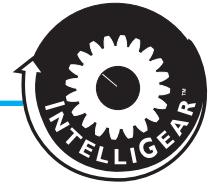




INTELLIGEAR™

Variable Speed Gearmotors



General Information

1 - GENERAL INFORMATION

1.1 - General operating principle

The INTELLIGEAR is a combination of a 3-phase induction motor and an integrated variable speed drive. The motor can be combined with many gear types from Emerson Power Transmission's range.

In the standard product version, the integrated drive does not require any connection other than the power supply. The options may be used to broaden the application range of the INTELLIGEAR. Based on the advanced technology of the IGBT power module, very high efficiency and reduced noise levels are achieved.

1.2 - Product name

INTELLIGEAR Range					
230V Single Phase Power Supply		230V Three Phase Power Supply		460V Three Phase Power Supply	
Catalog Number	Motor HP	Catalog Number	Motor HP	Catalog Number	Motor HP
I 21 M 033	0.33	I 21 033	0.33	I 21 033	0.33
I 21 M 050	0.50	I 21 050	0.50	I 21 050	0.50
I 21 M 075	0.75	I 21 075	0.75	I 21 075	0.75
I 21 M 100	1.0	I 21 100	1.0	I 21 100	1.0
I 22 M 150	1.5	I 22 150	1.5	I 21 150	1.5
I 22 M 200	2.0	I 22 200	2.0	I 21 200	2.0
				I 22 300	3.0
				I 22 500	5.0

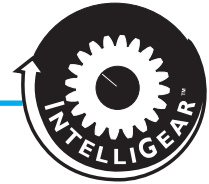
INTELLIGEAR Speed Controlling Options	
Designation	Description
P1	Run/Stop/Control Knob mounted on INTELLIGEAR enclosure
P2	For./Rev./Stop/Control Knob mounted on INTELLIGEAR enclosure
P3	Control Knob(only) mounted on INTELLIGEAR enclosure
P4	Speed Potentiometer (only) mounted inside INTELLIGEAR enclosure
PR1	Run/Stop/Speed Pot. in a separate Op. Station enclosure
R	Remote signal following (either 0-10VDC or 4-20mA)
RP	Controlled by Fieldbus: PROFIBUS DP
RI	Controlled by Fieldbus: INTERBUS S
RD	Controlled by Fieldbus: DEVICENET
RC	Controlled by Fieldbus: CAN OPEN

INTELLIGEAR Options	
Part ID	Description
CDC ITG	INTELLIGEAR Parameter Setting console w/3 meter cable
AEM904KA006	DC Braking resistors 100W
AEM904KA005	DC Braking resistors 200W



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1.3 - Characteristics

1.3.1 - Electrical data

Single Phase Design

Power supply	230 V ± 10%, 50 - 60 Hz
Output voltage	From input voltage down to (input voltage/speed range)
Power range	0.33, 0.50, 0.75, 1.0, 1.5, 2.0 HP
Maximum numbers of power-ups per hour	10

Three Phase Design

Power supply	230 V ± 10%, 50 - 60 Hz	460 V ± 10%, 50 - 60 Hz
Output voltage	From input voltage down to (input voltage/speed range)	
Power range	0.33, 0.50, 0.75, 1.0, 1.5, 2.0 HP	0.33, 0.50, 0.75, 1.0, 1.5, 2.0, 3.0, 5.0 HP
Maximum numbers of power-ups per hour	Unlimited	

1.3.2 - Characteristics and functions

CHARACTERISTIC	INTELLIGEAR	
Overload	150 % of full load setting for 40 seconds, 10 times per hour	
Motor Frequency Variation Range	Standard	11 to 60 Hz and 6:1 constant torque up to 3 HP 12 to 74 Hz and 6:1 constant torque 5 HP
	Special	6 to 120 Hz range adjustable using console option
Efficiency	97.5 % x motor efficiency x gear efficiency	

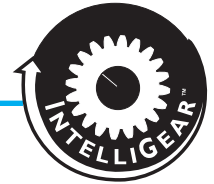
DRIVE CONTROL	INTELLIGEAR	
Speed Reference	<ul style="list-style-type: none"> • Analog reference (0V or 4mA = minimum speed) (10V or 20mA = maximum speed) <ul style="list-style-type: none"> - 0 to 10 VDC with control knob on IntelliGear enclosure (options P1,P2,P3) - 0 to 10 VDC with potentiometer in IntelliGear enclosure (option P4) - 0 to 10 VDC with remote potentiometer (option PR1) - 0 to 10 VDC with customer signal * (option R) - 4 to 20 mA with customer signal * (option R) • Digital reference <ul style="list-style-type: none"> - one to four preset speeds (accessible via console option) • With fieldbus 	
	Speed regulation	Regulation of the reference with the integrated PI loop (accessible with the console option). PI sensor characteristics : 0 - 10V or 4 - 20 mA *

* User adjust using mini-Dip switches (see section 2.3) prior to start-up.



INTELLIGEAR™

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1.3.2 - Characteristics and functions (Cont'd.)

DRIVE CONTROL	INTELLIGEAR
Run/Stop	<ul style="list-style-type: none"> • With the three phase power supply • With remote dry contact • With integrated Run/Stop (option P1) • With fieldbus options
Forward/Reverse	<ul style="list-style-type: none"> • With internal lead connections to motor • With remote dry contact • With integrated For/Rev/Speed Knob control (option P2) • With fieldbus
Stop Mode	<ul style="list-style-type: none"> • On ramp (with dry contact or integrated Run/Stop option P1) • Freewheel stop (by cutting controller input power) • Freewheel stop (with dry contact or integrated Run/Stop option P1, accessible with console. • With electrical mechanical brake
Ramps	<ul style="list-style-type: none"> • Selection of acceleration and deceleration ramps with dry contact : 2 or 5 seconds. (The factory setting is 5 seconds for max. of 74 Hz) • Ramps adjustable from 0 to 90 seconds (accessible with console)
Fieldbus	PROFIBUS DP, INTERBUS S, DEVICENET, CAN OPEN

INDICATION	INTELLIGEAR									
Indicator Lamps for Options P1, P2, P3, P4	<ul style="list-style-type: none"> • Steady green light = main power source connected • Flashing green light = overload • Flashing green and red lights = current limit • Flashing red light = over or undervoltage • Steady red light = other fault dry contact - 1A - 250V - contact open, drive faulty or powered down 									
Relay	<ul style="list-style-type: none"> • Drive fault (other specifics possible with console option**) dry contact - 1A - 250V - contact open, drive faulty or powered down 									
Analog Output	<ul style="list-style-type: none"> • 0 to 10V, 3mA output <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Speed Indication</td> <td style="text-align: center;">Current Indication**</td> <td style="text-align: center;">Power Indication**</td> </tr> <tr> <td style="text-align: center;">0V = zero speed</td> <td style="text-align: center;">0V = 0 amps</td> <td style="text-align: center;">0V = 0 HP</td> </tr> <tr> <td style="text-align: center;">10V = max. speed</td> <td style="text-align: center;">10V = FL amps</td> <td style="text-align: center;">10V = Max. HP</td> </tr> </table>	Speed Indication	Current Indication**	Power Indication**	0V = zero speed	0V = 0 amps	0V = 0 HP	10V = max. speed	10V = FL amps	10V = Max. HP
Speed Indication	Current Indication**	Power Indication**								
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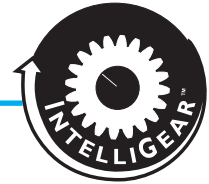
PROTECTION	INTELLIGEAR
Power	<ul style="list-style-type: none"> • Undervoltage • Overvoltage • Overloads : <ul style="list-style-type: none"> - overheating of drive and/or motor - protection against locked rotor • Short-circuit <ul style="list-style-type: none"> - motor windings
Control	<ul style="list-style-type: none"> • Short circuit on 0 - 10V - 24V inputs or outputs
Trip Clearance	<ul style="list-style-type: none"> • Via switching off the INTELLIGEAR

* User adjust using the "mini-DIP switch (see section 2.3) prior to start-up.

** See Console manual supplied with console

1.4 - Environmental characteristics

CHARACTERISTICS	LEVEL
Storage temperature	From -40C to +70C
Transport temperature	From -40C to +70C
Operating ambient temperature	From -20C to +40C (up to +50C with derating)
Altitude	Up to 3000 feet without derating
Ambient humidity	Without condensation
Vibration	Maximum acceleration 0.01 g2/Hz
Shocks	Peak acceration 20g
Immunity	Conforms to EN 50082-2
Radiated conducted emissions	Conforms to EN 50081
UL and CNL standard	Refer to UL File E211799
Enclosure degree (motor and controller)	NEMA 3R and 12



Variable Speed Gearmotors

2 - FAULTS - DIAGNOSTICS

Information relating to the status of the INTELLIGEAR is provided by 2 indicator lamps located on the control options.

Color and state of indicator lamps	Reason for fault	Checks to be performed
Steady green	No fault Power present	If the motor does not rotate, check that: - terminals 1 and 3 are connected - a run command has actually been enabled: terminals 7 and 10 or 8 and 10 are connected
Flashing green and red	Current limiting	• Check that the motor is not overloaded or stalled
Flashing green	Overload	• The motor is overloaded: check the motor current using a clamp ammeter (section 6.2.2)
Steady red	• Short-circuit of a motor winding • Locked motor rotor • Faulty insulation of a winding • (I ² T) overheating • Internal fault	• Check that no incident has occurred • Switch off and then on again to clear the fault • Check that the deceleration ramp is long enough (5s) for applications with high inertia • If the fault remains, consult Emerson Power Transmission technical service
Flashing red	• Undervoltage • Overvoltage	• Check the mains voltage • Check that the deceleration ramp is long enough (5s) for applications with high inertia • Switch off and then on again

Trips can be cleared by switching off the INTELLIGEAR.

3 - OPERATING EXTENSIONS

3.1 - Control knob with integrated run/stop control option (P1)

In addition to speed control, a run button and a stop button make it possible to control the Intelligear locally, once it has been switched on, as required. For a run command to be taken into account, the button must be held down for one second.

- It is connected on the P2 connector.
- Has two indicator lights.



3.3 - Speed control knob option (P3)

The speed is set using a knob with graduations from 15 to 100%. Has two indicator lamps. It is connected on the P2 connector.



3.2 - Control knob with forward/reverse/stop control option (P2)

In addition to speed control, a forward button, a reverse button and a stop button make it possible to control the Intelligear locally, once it has been switched on, as required. For a run command to be taken into account, the button must be held down for one second.

- Connected on the P2 connector.
- Has two indicator lights.

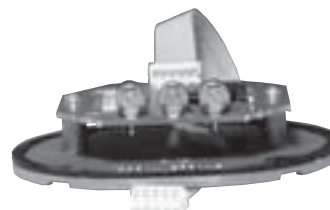


3.4 - Internal speed control option (P4)

The speeds are set on potentiometers which are accessible once the cover has been removed.

- a Max. Spd potentiometer: calibration of the maximum speed
- a Min. Spd potentiometer: calibration of the minimum speed
- an Int. Spd potentiometer: speed control which replaces control via the control knob.

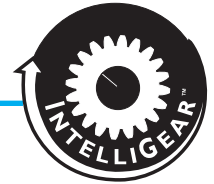
There are also two indicator lights.





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3.5 - Braking resistor option (RF100 - RF200)

For operation in four quadrants and energy dissipation, resistors are mounted directly onto the INTELLIGEAR.



	RF100	RF200 (2x100)		Minimum ohmic value
	P peak kW	P peak kW	Resistor connection	
I21	5.6	2.8	series	100Ω
I21M	1.3	2.6	parallel	50Ω
I22	5.6	11.2	parallel	50Ω

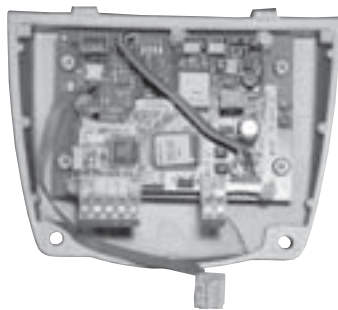
RF100 = thermal power 100W

RF200 = thermal power 200W

External resistors with greater thermal power can be used. Provided that the minimum ohmic value is maintained.

3.6 - Fieldbus options

The interface card is fixed inside the casing cover. Protocols: PROFIBUS DP, INTERBUS S, DEVICENET.



3.7 - Parameter-setting console option (CDC-ITG)

The console option provides access to the drive internet settings (terminal block configuration, ramp, speed and P1 settings, etc.) See INTELLIGEAR parameter-setting manual included.

Description of the option:

1 CDC-VMA console

1 cable (3m long)



3.8 - EMC filter option (FLT VMA21M)

The filter is mounted inside INTELLIGEAR drive enclosure. The INTELLIGEAR then conforms to standard EN 50081-1 (domestic level).