JAGUAR VX Torque Vector System

Sensorless Vector Variable Frequency Inverters - 0.4kW to 280kW

- High performance, Torque Vector Control
- Up to 250% torque at 1Hz
- Low torque ripple at low speed
- Fast torque response - 200mS, 0 - 100% load
- Load speed regulation < 1% open loop
- User friendly self tuning to motor
- Ultra compact IP20 enclose (≤ 22kW)
- Dual LED/LCD plain English display
- User programmable I/O
- Low motor noise profile
- Auto energy saving function
- Renowned IMO 5 year warranty

Specifications

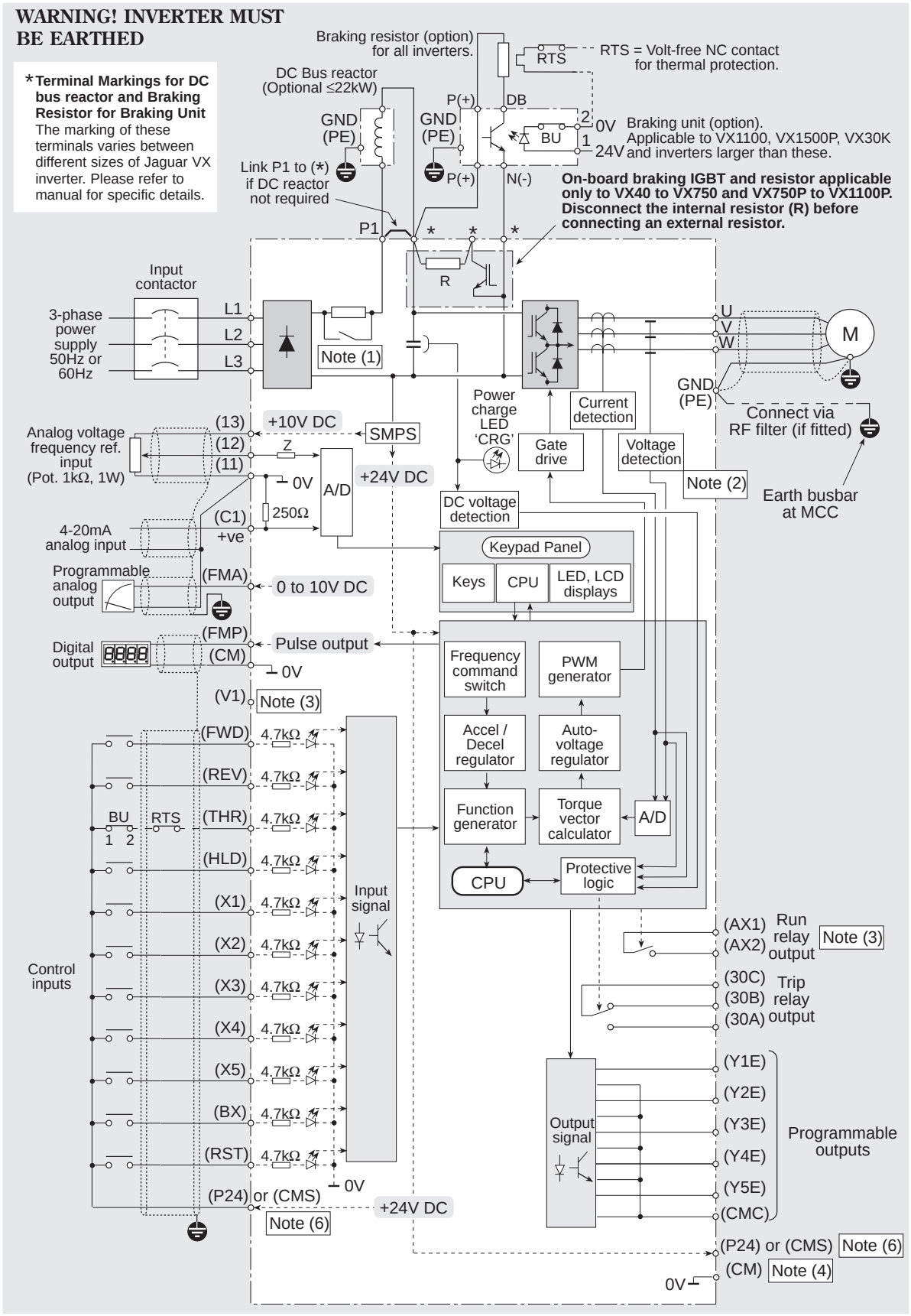
JAGUAR VX ORDER CODES	VX40	VX75	VX150	VX220	VX400	VX550	VX750	VX1100	VX1500	VX1850	VX2200	
JAGUAR VXP ORDER CODES	-	-	-	-	-	-	VX750P	VX1100P	VX1500P	VX1850P	VX2200P	
MOTOR RATING (kW)	0.4	0.75	1.5	2.2	4	5.5	7.5	11	15	18.5	22	
RATED O/P CURRENT (A)	1.5	2.5	3.7	5.5	9	13	18	24	30	39	45	
100% RATED I/P CURRENT RMS (AT 400V)*	1.7	2.9	5.5	7.7	12.6	18.2	24.4	36.3	48.5	59	72	
HEAT LOSS (W) (AT 2 KHz CARRIER FREQUENCY)	45	50	65	85	110	140	200	315	340	450	510	
INPUT VOLTAGE/FREQUENCY	3 PHASE				380 TO 415V (+10%,-15%)			50/60 Hz (+5%,-5%)				
WEIGHT (Kg)	2.4	3.2	3.2	3.2	3.2	6.5	5.3/6.5	10.6/6.5	10.6/11.5	10.6/11.5	10.6/12	
INPUT POWER FACTOR**	0.96	0.95	0.94	0.93	0.94	0.95	0.95	0.95	0.94	0.95	0.96	
OUTPUT VOLTAGE FREQUENCY	3 PHASE				0 - V INPUT			0.2 - 400 Hz ('P' MODELS 0.2 - 120 Hz)				

JAGUAR VX ORDER CODES	VX30K	VX37K	VX45K	VX55K	VX75K	VX90K	VX110K	VX132K	VX160K	VX200K	VX220K	
JAGUAR VXP ORDER CODES	VX30KP	VX37KP	VX45KP	VX55KP	VX75KP	VX90KP	VX110KP	VX132KP	VX160KP	VX200KP	VX220KP	VX280KP
MOTOR RATING (kW)	30	37	45	55	75	90	110	132	160	200	220	280
RATED O/P CURRENT (A)	60	75	91	112	150	176	210	253	304	377	415	520
100% RATED I/P CURRENT RMS (AT 400V)*	58	71	85	104	141	168	203	243	293	363	400	508
HEAT LOSS (W) (AT 2 KHz CARRIER FREQUENCY)	1200	1400	1600	1900	2300	2700	3000	3400	4000	4600	5000	6000
INPUT VOLTAGE/FREQUENCY	3 PHASE				380 TO 415V (+10%,-15%)			50/60 Hz (+5%,-5%)				
WEIGHT (Kg)	36	36/37	37/44	45/54	54/61	61/88	88	88/120	120/125	125/177	177	177
INPUT POWER FACTOR**	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
OUTPUT VOLTAGE FREQUENCY	3 PHASE				0 - V INPUT			0.2 - 400 Hz ('P' MODELS 0.2 - 120 Hz)				

NOTES * FIGURES FOR INPUT ARE QUOTED WHEN USING A DC REACTOR FROM VX30K AND VX30KP UP, NO REACTOR < 30KW

** AT 100% FULL LOAD CURRENT AND USING DC REACTOR

Basic circuit configuration and terminals



NOTES (1) For inverters rated ≤22kW the inrush contactor is replaced by an SCR.
(2) Voltage detection circuit applicable for inverters ≥30kW only.
(3) Standard for inverters ≥30kW, optional for smaller models.
(4) Two terminals (CM) standard for inverters ≤22kW, one for ≥30kW.
(5) If motor thermistors are required, please consult IMO.
(6) Internal +24V DC supply terminal designated P24 (≤22kW) or CMS (≥30kW).

0V Common Terminals (11) and (CM) are optically isolated.
Relay status shown as at inverter 'power ON' or 'healthy'.

Control circuit connections

Purpose	*Terminal*	*Terminal Name*	*Description*	
Analog frequency setting	11	Speed reference 0V common	For use with terminals 12, 13 and C1 (and V1, ≥30kW only)	
	12	Potentiometer input	Maximum speed demand is at +10V with a 0V to +10V DC input. Input impedance 20kΩ (≤22kW), 22kΩ (≥30kW).	
	13	Potentiometer supply	Regulated +10V DC power supply for 1kΩ min. speed control potentiometer. Input 10mA max.	
	C1	Current loop input	Maximum speed demand is at 20mA with a 4-20mA DC input, impedance 250Ω. Inverter output frequency is proportional to current input signal, zero speed = 4mA.	
	V1*	Auxiliary freq. reference	Bipolar 0V to ±10V input.	
Programmable inputs	CM†	0V common	0V common terminals for general use.	
	FWD	Forward and STOP command	FWD-P24 closed: Motor runs forward open: Motor decelerates to rest	If FWD and REV are both closed or both open, inverter output STOPS.
	REV	Reverse and STOP command	REV-P24 closed: Motor runs in reverse open: Motor decelerates to rest	
	HLD	FWD/REV command hold	HLD-P24 closed: Latches momentary FWD or REV inputs open: FWD/REV non-latching	
	BX	Coast-to-stop command	BX-P24 closed: Inhibit inverter output instantaneously open: Normal	
	THR	External Trip/Alarm input	THR-P24 closed: Normal open: Trip (OH2) inverter output instantaneously	
	RST	Trip/Alarm RESET	If RST-P24 closed for ≥100ms, inverter internal fault trips are reset, and also alarm 30A/B/C (see below).	
	X1	Programmable input 1	Preset speeds or motorised potentiometer	
	X2	Programmable input 2		
	X3	Programmable input 3	Preset speeds or mains-to-inverter changeover	
	X4	Programmable input 4	Preset acc/dec command. LOC/REM changeover. DC injection brake command.	
	X5	Programmable input 5	Preset acc/dec times. 2nd motor V/F ratio. Data protection enable/disable.	
	P24	+24V DC power supply	24V current source for programmable I/O terminals and for FWD, REV, HLD, BX, THR, RST and X1 to X5.	
	P24			
Meter outputs	FMA	Analog meter	Output frequency, current, torque or load factor can be selected. 0V to +10V DC at 2mA max. (Min. impedance 5kΩ)	
	FMP	Pulse frequency meter	Pulse output proportional to inverter output frequency. Pulse frequency 6 to 100 x O/P Hz at +10V DC (adjustable).	
Programmable outputs	CMC	Open-collector common	0V	Output: 27V DC, 50mA per O/P channel, total 50mA maximum. **Caution** **Read Technical Manual before use.**
	Y1E	Programmable output 1	Up to 16 different outputs can be programmed from the operating Functions representative of dynamic operating conditions. Factory defaults: Y1E Inverter running Y2E FAR Y4E Overload early warning Y3E FDT Y5E Undervoltage	
	Y2E	Programmable output 2		
	Y3E	Programmable output 3		
	Y4E	Programmable output 4		
	Y5E	Programmable output 5		
Relay outputs	30A 30B 30C	Normally open Normally closed Common	Relay changes state when an internal protection function is active and when the inverter trips. Contact: 250V AC, capacity 0.5A, cosϕ 0.3	
	AX1* AX2*	Run relay	Relay closes when inverter is running Contact: 250V AC, capacity 0.5A, cosϕ 0.3	

* Standard for ≥30kW only, optional for ≤22kW. † Two CM terminals for ≤22kW, one for ≥30kW.

Parameter list/function code table

Group	*No.*	*Name*	*LCD Display*	*Setting range*	*Unit*	*Resol.*	*Def.*
Basic Functions	00	Frequency command	00 FREQ COMND	0 = KEYPAD, ∧ or ∨ keys 1 = TERMINAL, 0 to +10V 2 = TERMINAL, 4 to 20mA	—	—	0
	01	Operating mode	01 OPR METHOD	0 = KEYPAD, RUN/STOP keys 1 = TERMINAL, (FWD) & (REV)	—	—	0
	02	Max. O/P frequency	02 MAX Hz	*VX*, 50-400Hz *VX…P*, 50-120Hz	Hz	1	50
	03	Base freq., motor 1	03 BASE Hz -1	*VX*, 50-400Hz *VX…P*, 50-120Hz	Hz	1	50
	04	Max. O/P V, motor 1	04 RATED V -1	0 = Output dependent on supply V* 320 to 480 = output V	V	1	400
	05	Accel. time, motor 1	05 ACC TIME 1	0.01 to 3600	s	0.01	6.00
	06	Decel. time, motor 1	06 DEC TIME 1	0.00 = ramp inhibit, or 0.01 to 3600	s	0.01	6.00
	07	Torque boost, motor 1	07 TRQ BOOST 1	0.0 = auto; 0.1 to 20.0 fixed boost	—	0.1	0.0 [0.1]
	08	Electronic thermal O/L, *type*	08 ELECTRN OL	0 = Inactive 1 = Active for standard motor 2 = Active for inverter-rated motor	—	—	1
	09	Electronic O/L, *level*	09 OL LEVEL	20% to 105% of inverter rating	A	0.01	†
	10	Restart after momentary power supply failure	10 RESTART	0 = Inactive 1 1 = Inactive 2 2 = Active, smooth recovery 3 = Active, restart at set Hz 4 = Active, restart at start Hz	—	—	3
	11	O/P freq. HI limit	11 H LIMITER	*VX*, 0-400Hz *VX…P*, 0-120Hz	Hz	1	70
	12	O/P freq. LO limit	12 L LIMITER	*VX*, 0-400Hz *VX…P*, 0-120Hz	Hz	1	0
	13	Min. O/P freq. (bias)	13 FREQ BIAS	*VX*, 0-400Hz *VX…P*, 0-120Hz	Hz	1	0
	14	Freq. I/P ref. gain	14 FREQ GAIN	0.0 to 200.0%	%	0.1	100.0
	15	Driving torque limit	15 DRV TORQUE	20 to 180, 999% (999 = no limit)	%	1	150 [120]
	16	Braking torque limit	16 BRK TORQUE	0, 20 to 180, 999% (999 = no limit)	%	1	100 [100]
	17	DC inj. brk. Start frequ.	17 DC BRK Hz	0.0 to 60.0Hz	Hz	0.1	0.0
	18	DC inj. brk. Brkg. level	18 DC BRK LVL	0.0 to 100%	%	0.1	0.0
	19	DC inj. brk. Brkg. time	19 DC BRK t	0.0 (brake inactive), or 0.1 to 30.0s	s	0.1	0.0
	20 to 26	Pre-set multistep frequencies 1 to 7	20 MULTI Hz -1 to 26 MULTI Hz -7	*VX* 0.00, 0.20 to 400.0Hz *VX…P* 0.00, 0.20 to 120.0Hz (0.00 = preset disabled)	Hz	0.01	0.00
	27	Intl. electronic thermal O/L for intl. brkg. R	27 DBR OL	0 = Inactive 1 = Active for intl. R, invrs. ≤7.5kW 2 = Inactive	—	—	1 [0]
	28	Slip compensation	28 SLIP COMP	-9.9Hz to +5.0Hz	Hz	0.1	0.0
	29	Torque vector control	29 TRQ VECTOR	0 = Inactive 1 = Active		—	0
	30	Number of motor poles	30 MTR POLES	2 to 14 (even nos. only)	—	2	4

Functions marked by heavy outlines can be set whilst the inverter is running. *DEF* = factory-set defaults. *Resol* = resolution. Default values are for all inverters. Where *VX…P* defaults differ, they are shown in square brackets […].

* LCD display shows 0V † Approx. rated current for inverter-rated motors

Parameter list/function code table (continued)

Group	*No.*	*Name*	*LCD Display*	*Setting range*	*Unit*	*Resol.*	*Def.*
31	31	*Function Block 32 to 41*	31 • 32—41 •	0 = Functions 32 to 41 hidden 1 = Functions 32 to 41 displayed	—	—	0
Prog. I/P terminals	32	Select the functions of terminals X1 to X5	32 X1-X5 FUNC	0000 to 2222	—	—	0000
Acc./Dec. times	33 34 35 36 37 38	Accel time 2 Decel time 2 Accel time 3 Decel time 3 Accel time 4 Decel time 4	3X ACC TIME X	0.00 = Ramp inhibited, coasting 0.01 to 3600s	s	0.01	10.00 10.00 15.00 15.00 3.00 3.00
2nd motor	39	Base freq., motor 2	39 BASE Hz -2	*VX*, 50-400Hz *VX…P*, 50-120Hz	Hz	1	50
	40	Max. O/P V, motor 2	40 RATED V -2	0 = Output dependent on supply V* 320 to 480 = output V	V	1	400
	41	Torque boost, motor 2	41 TRQ BOOST 2	0.1 to 20.0 fixed boost	—	0.1	2.0
42	42	*Function Block 43 to 51*	42 • 43—51 •	0 = Functions 43 to 51 hidden 1 = Functions 43 to 51 displayed	—	—	0
Digital O/P	43	FMP terminal, pulse rate multiplier	43 FMP PULSES	x6 to x100	—	1	x24
	44	Voltage O/P adjustmt.	44 FMP V-ADJ	50% to 120%	%	1	100%
Analog O/P	45	FMA terminal, voltage adjustment	45 FMA V-ADJ	65% to 200%	%	1	100%
	46	FMA terminal function	46 FMA FUNC	0 = O/P freq. 1 = O/P current 2 = O/P torque 3 = %FLT	—	—	0
O/P term. functions	47	Select the functions of terminals Y1E to Y5E	47 Y1-Y5 FUNC	00000 to FFFFF	—	—	01234
	48	FAR function ('At Speed' window)	48 FAR HYSTR	0.0 to 10.0Hz	Hz	0.1	2.5
	49	FDT function (level)	49 FDT LEVEL	*VX*, 0-400Hz *VX…P*, 0-120Hz	Hz	1	50
	50	FDT function (hyster.)	50 FDT HYSTR	0.0 to 30.0Hz	Hz	0.1	1.0
	51	O/L alarm (level)	51 OL WARNING	Approx. 20 to 105% inverter rated current	A	0.01	†
52	52	*Function Block 53 to 59*	52 • 53—59 •	0 = Functions 53 to 59 hidden 1 = Functions 53 to 59 displayed	—	—	0
Frequency control	53	Skip frequency 1	53 JUMP Hz 1	*VX*, 0-400Hz *VX…P*, 0-120Hz	Hz	1	0
	54	Skip frequency 2	54 JUMP Hz 2	*VX*, 0-400Hz *VX…P*, 0-120Hz	Hz	1	0
	55	Skip frequency 3	55 JUMP Hz 3	*VX*, 0-400Hz *VX…P*, 0-120Hz	Hz	1	0
	56	Skip hysteresis	56 JUMP HYSTR	0 to 30Hz	Hz	1	3
	57	Starting frequency	57 START Hz	0.2Hz to 60.0Hz	Hz	0.1	0.5
	58	Holding time	58 HOLDING t	0.0 to 10.0s	s	0.1	0.0
	59	Frequency I/P reference filter	59 FILTER	0.01 to 5.00s	s	0.01	0.05

Functions marked by heavy outlines can be set whilst the inverter is running. *DEF* = factory-set defaults. *Resol* = resolution. Default values are for all inverters. Where *VX…P* defaults differ, they are shown in square brackets […].

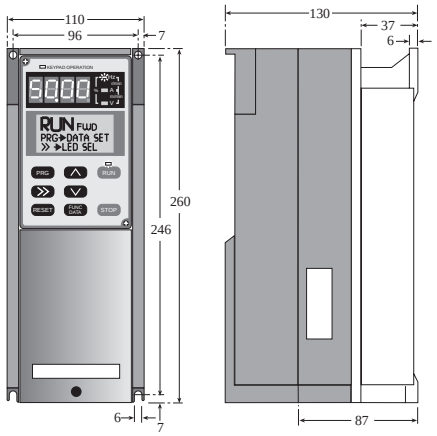
* LCD display shows 0V † Approx. rated current for inverter-rated motors

Parameter list/function code table (continued)

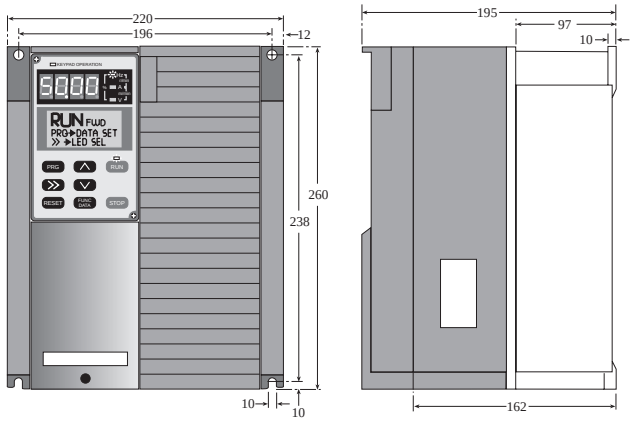
Group	*No.*	*Name*	*LCD Display*	*Setting range*	*Unit*	*Resol.*	*Def.*
60	60	*Function Block 61 to 79*	60 • 61—79 •	0 = Functions 61 to 79 hidden 1 = Functions 61 to 79 displayed	—	—	0
LED & LCD displays	61	LEDs, function for normal display	61 LED MNTR 1	0 to 8	—	—	0
	62	LEDs display at STOP	62 LED MNTR 2	0 = Set point (flashing) 1 = Actual output value only	—	—	0
	63	Coefficient for machine speed and line speed	63 SPEED COEF	0.01 to 200.00 x Hz output	—	0.01	0.01
	64	LCD display function	64 LCD MNTR	0 to 3: Drive status, standard screen or bar graphs	—	—	0
Pattern operations	65	Pattern operation, mode select	65 PATTERN	0 to 3: Inactive or cyclic	—	—	0
	66 to 72	Pattern stages 1 to 7	6X STAGE X	Operation time 0.00 to 6000s FWD/REV codes F1 to F4 ACC/DEC codes R1 to R4	s	0.01	0.00 F1
	73	ACC/DEC mode	73 ACC PTN	0 to 2: linear, S-curve, non-linear	—	—	0
Special Functions 1	74	Series brake motor driving	74 SERIES BRK	*Not available*			—
	75	Energy saving	75 ENERGY SAV	0 = Inactive 1 = Active	—	—	0 [1]
	76	REV phase sequ. lock	76 REV LOCK	0 = Inactive 1 = Active	—	—	0
	77	Data initialising (data reset)	77 DATA INIT	0 = Inactive 1 = Active	—	—	0
	78	Language of displays	78 LANGUAGE	0 to 3 0 = GERMAN, 1 = ENGLISH 2 = SPANISH, 3 = ITALIAN	—	—	1
	79	LCD display brightness	79 BRIGHTNESS	0 (bright) to 10 (dark)	—	—	5
80	80	*Function Block 81 to 94*	80 • 81—94 •	0 = Functions 81 to 94 hidden 1 = Functions 81 to 94 displayed	—	—	0
Special Functions 2	81	PWM carrier frequency (motor sound)	81 MTR SOUND	0 (low) to 10 (high) carrier frequency	—	—	10
	82	Auto-restart, start delay	82 RESTART 1	0.0 to 5.0s	s	0.1	0.1
	83	Auto-restart, freq. fall rate	83 FALL RATE	0.00 to 100.00	Hz/s	1	10
	84	Auto-reset, number of restarts	84 AUTO RESET	0 to 7	—	—	0
	85	Auto-reset, interval	85 RESET INT	2 to 20s	s	—	5
Motor characteristics	86	Motor 1, frame size	86 MOTOR CAP	0 = 1 higher 1 = nominal 2 = 1 lower 3 = 2 lower	—	—	1
	87	Motor 1, rated current	87 MOTOR 1-Ir	0.00 to 2000A	A	0.1	†
	88	Motor 1, no-load current	88 MOTOR 1-Io	0.00 to 2000A	A	0.1	†
	89	Motor 2, rated current	89 MOTOR 2-Ir	0.00 to 2000A	A	0.1	†
	90	Motor 1, tuning	90 TUNING	0 = Inactive 1 = Active	—	—	0
	91	Motor 1, %R1 value	91 %R1 SET	0.00 to 50.00%	%	0.01	†
Special	92	Motor 1, %X value	92 %X SET	0.00 to 50.00%	%	0.01	†
Functions 3	93 94	*Manufacturer's use only*	93 DD FUNC 1 94 DD FUNC 2				
	95	Data security	95 DATA PRTC	0 = Unlocked 1 = Data secure	—	—	0

Dimensions (mm) 0.4 to 280kW

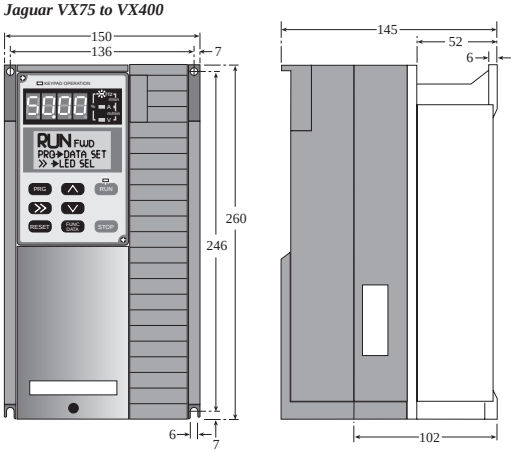
Jaguar VX40



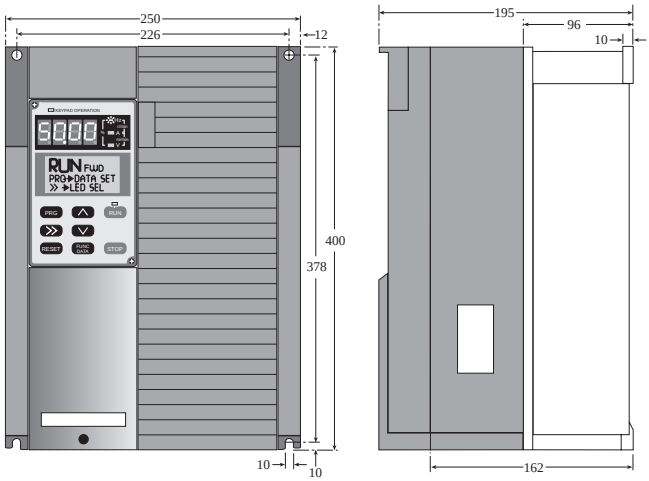
Jaguar VX550, VX750, and VX750P, VX1100P



Jaguar VX75 to VX400

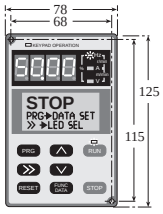


Jaguar VX1100 to VX2200 and VX1500P to VX2200P



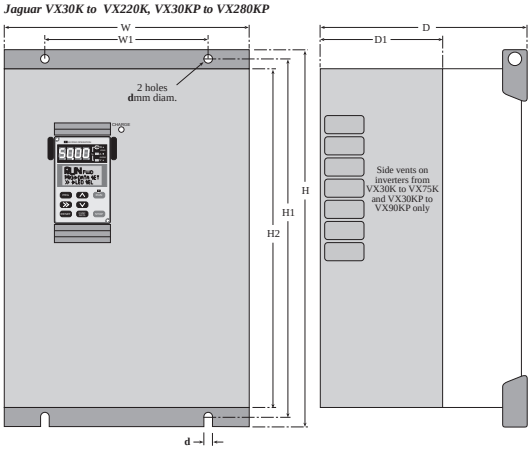
***N.B. JAGUAR VX inverters are designed for use within shielded steel enclosures**

REMOTE MOUNTING
KEYPAD WITH OPTIONAL
2M CONNECTOR CABLE



Keypad panel mounting dimensions. Common to all modules.

Jaguar VX30K to VX220K, VX30KP to VX280KP



VX		W	W1	H	H1	H2	D	D1	d
30K-D		340	240	550	530	500	290	185	10
30KP-D	37KP-D	340	240	550	530	500	290	185	10
37K-D	45KP-D	375	275	550	530	500	290	185	10
45K-D	55KP-D	375	275	675	655	625	275	170	10
55K-D	75KP-D	530	430	675	645	610	290	185	15
75K-D	90KP-D	530	430	740	710	675	300	180	15
90K-D	110KP-D	530	430	740	710	675	330	205	15
110K-D	132KP-D	530	430	740	710	675	330	205	15
132K-D	160KP-D	530	430	1000	970	935	435	295	15
160K-D	200KP-D	530	430	1000	970	935	435	295	15
200K-D	220KP-D	680	580	1000	980	N/A	435	320	N/A
220K-D	280KP-D	680	580	1000	980	N/A	435	320	N/A

Optional accessories

Accessory	Function
Filters	A specially designed range of easily fitted low profile 'footprint' filters up to 22kW and stand alone filters up to 280kW are available to provide maximum RF reduction. See page 363 for details.
Function Copy Unit	Saves and loads stored set-ups for up to 12 complete function sets. 'Copy Edit', 'verify' and 'write-protected' modes available. Operates from an 85V to 265V AC supply. Target or donor drives do not need to be powered up to transfer data.
Encoder Feedback Module	Enables Jaguar VX inverters to be operated in closed-loop control mode. Speed control range 180 to 3600 rpm. Speed variation ±0.2% at 3600 rpm. Encoder output, 20 to 2000 pulses per revolution.
Relay Output Module	Converts programmable outputs Y1E . . . Y5E to relay outputs. Contact rating 0.3A at 250V AC, cosØ = 0.3.
PID Control Mode Unit	Digitally adjustable P, I and D terms through the medium of a supplementary function menu. Reference input 0V to 10V DC Feedback input 0V to 10V DC or 4-20mA DC.
Synchronisation Module	Provides a multi-synch tasking capability via rotary encoders for Master/Slave and 'Follower' applications.
Serial Communication Module	RS422 or RS485, multi-drop up to 31 Jaguar VX inverters of all sizes. Opto-isolated.
FieldBus Modules	Dedicated FieldBus units which allow the connection of multiple Jaguar VX inverters to a site standard FieldBus link. FieldBus systems available: Modbus Plus Interbus S Profibus DP DeviceNet
Regenerative Brake Units	Provides additional braking for high inertia loads for inverters 11kW to 280kW. (Units below 11kW have regenerative braking capability built in as standard).
Pod Extension Cable	Allows the Jaguar VX keypad to be removed and mounted separately.