



# MITSUBISHI Z200 VARIABLE FREQUENCY DRIVE PARAMETER UNIT (PU) REFERENCE GUIDE

## REMOTE/LOCAL OPERATION

FUNCTION	KEYPAD SEQUENCE	DESCRIPTION
OPERATE VFD REMOTELY	<b>[EXT OP]</b>	START/STOP COMMANDS FROM EXTERNAL CONTACTS, SPEED REFERENCE FROM REMOTE SPEED POT OR INSTRUMENT SIGNAL, ETC. PU COMMANDS WILL BE IGNORED.
NOTE: CANNOT SWITCH TO [EXT OP] WHILE RUNNING IN [PU OP] MODE, OR WHEN THERE IS A REMOTE RUN COMMAND.		
OPERATE VFD LOCALLY	<b>[PU OP]</b>	ALLOWS VFD OPERATION FROM PU COMMANDS
NOTE: CANNOT SWITCH TO <b>[PU OP]</b> WHILE RUNNING IN <b>[EXT OP]</b> MODE		

## START / STOP / JOG / SPEED COMMAND USING PU

FUNCTION	KEYPAD SEQUENCE	DESCRIPTION
START/STOP	<b>[PU OP]</b> <b>[FWD]</b> <b>[PU OP]</b> <b>[REV]</b> <b>[PU OP]</b> <b>[STOP]</b>	RUN IN FORWARD DIRECTION RUN IN REVERSE DIRECTION STOP
JOG	<b>[PU OP]</b> <b>[SHIFT]</b> <b>[FWD]</b> (OR <b>[REV]</b> )	ACCELERATES TO PRESET JOG SPEED WHILE [FWD] OR [REV] KEY IS DEPRESSED. DECELERATES TO A STOP WHEN KEY IS RELEASED.
CANCEL JOG	<b>[PU OP]</b>	
SPEED CHANGE	<b>[PU OP]</b> <b>[****]</b> <b>[WRITE]</b>	ACCELERATES (OR DECELERATES) TO SELECTED SPEED. NUMBERS KEYED CORRESPOND TO SAME UNITS THE DIGITAL SPEED METER IS CALIBRATED TO DISPLAY (HZ, RPM, FPM, ETC.)
SPEED CHANGE (ALTERNATE METHOD)	<b>[PU OP]</b> <b>[▲]</b> <b>[PU OP]</b> <b>[▼]</b>	TO INCREASE SPEED, KEEP KEY DEPRESSED UNTIL DESIRED SPEED IS REACHED. TO DECREASE SPEED, KEEP KEY DEPRESSED UNTIL DESIRED SPEED IS REACHED.

## READ / WRITE OF FUNCTION SETTINGS

FUNCTION	KEYPAD SEQUENCE	DESCRIPTION
READ ONLY FIRST FUNCTION GROUP	<b>[SET]</b> <b>[*]</b> <b>[READ]</b>	EXISTING SETTING FOR SELECTED FUNCTION IS DISPLAYED.
READ ONLY SECOND FUNCTION GROUP	<b>[SET]</b> <b>[2ND]</b> <b>[**]</b> <b>[READ]</b>	EXISTING SETTING FOR SELECTED FUNCTION IS DISPLAYED.
READ ONLY THIRD FUNCTION GROUP	<b>[PU OP]</b> <b>[2ND]</b> <b>[0]</b> <b>[1]</b> <b>[SHIFT]</b> <b>[READ]</b>	EXISTING SETTING FOR SELECTED FUNCTION IS DISPLAYED.
READ & WRITE ALL FUNCTION GROUPS	<b>[PU OP]</b> (READ ONLY OPERATION) <b>[****]</b> <b>[WRITE]</b>	EXISTING SETTING FOR SELECTED FUNCTION IS DISPLAYED, THEN NEW SETTING IS PROGRAMMED INTO VFD.
WRITE ONLY FIRST FUNCTION GROUP	<b>[PU OP]</b> <b>[SET]</b> <b>[*]</b> <b>[****]</b> <b>[WRITE]</b>	NEW SETTING IS PROGRAMMED INTO VFD.
WRITE ONLY SECOND FUNCTION GROUP	<b>[PU OP]</b> <b>[SET]</b> <b>[2ND]</b> <b>[**]</b> <b>[****]</b> <b>[WRITE]</b>	NEW SETTING IS PROGRAMMED INTO VFD.
WRITE ONLY THIRD FUNCTION GROUP	<b>[PU OP]</b> <b>[2ND]</b> <b>[0]</b> <b>[1]</b> <b>[SHIFT]</b> <b>[****]</b> <b>[WRITE]</b>	NEW SETTING IS PROGRAMMED INTO VFD.
CLEAR ALL SETTINGS	<b>[PU OP]</b> <b>[SET]</b> <b>[2ND]</b> <b>[0]</b> <b>[0]</b> <b>[0]</b> <b>[0]</b> <b>[WRITE]</b>	THIS COMMAND WILL CANCEL ALL USER FUNCTION SETTINGS AND RETURN VFD TO INITIAL FACTORY SETTINGS.

**[ ]** = PARAMETER UNIT KEY

**[\*]** = SINGLE DIGIT FUNCTION NO. (0-9)

**[\*\*]** = TWO DIGIT FUNCTION NO. (10-99)

**[\*\*\*\*]** = DESIRED VALUE (UP TO 4 DIGITS)

## MONITORING OF VARIABLE FREQUENCY DRIVE OPERATION AND ALARMS

FUNCTION	KEYPAD SEQUENCE	DESCRIPTION
SPEED	MONITOR	SPEED IS DISPLAYED AND "HZ" LAMP IS ILLUMINATED.
MOTOR CURRENT	MONITOR SHIFT	AMPS ARE DISPLAYED AND "A" LAMP IS ILLUMINATED.
OUTPUT VOLTAGE	MONITOR SHIFT SHIFT	VOLTS ARE DISPLAYED AND "V" LAMP IS ILLUMINATED
LATEST ALARM	MONITOR SHIFT SHIFT SHIFT	MOST RECENT ALARM CODE IS DISPLAYED PRECEDED BY "E".
PRECEDING 3 ALARMS	MONITOR SHIFT SHIFT SHIFT READ ...	EACH TIME [READ] IS PRESSED, THE NEXT MOST RECENT ALARM CODE IS DISPLAYED AND PRECEDED BY AN "E" (NO DECIMAL).
MOTOR RUNNING FORWARD		LED ABOVE [EXT OP] OR [PU OP] KEY IS FLICKERING
MOTOR RUNNING REVERSE		LED ABOVE [EXT OP] OR [PU OP] KEY IS FLICKERING AS IS "HZ", "A", OR "V" LED.
STALL PREVENTION ACTIVATED		2 LAMPS AMONG THE "HZ", "A" AND "V" LAMPS FLICKER. THE ACTIVATED MONITOR MODE LAMP DOES NOT FLICKER.
INCORRECT PARAMETER UNIT OPERATION		<p>"ERR" IS DISPLAYED, INDICATING ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>- FUNCTION "WRITE" IS ATTEMPTED:               <ul style="list-style-type: none"> <li>-DURING OPERATION OF MOTOR</li> <li>-WHILE IN [EXT OP] MODE</li> <li>-WHILE PARAMETER WRITE IS PROHIBITED (FUNCTION 77)</li> </ul> </li> <li>-ENTERED VALUE IS OUTSIDE OF THE SPECIFIED RANGE</li> <li>-INVALID FUNCTION # IS ENTERED</li> </ul>

### MISCELLANEOUS PARAMETER UNIT INFORMATION

1. THE [PU OP] KEY NEEDS TO BE PRESSED ONLY ONCE WHEN READ/WRITE OF FUNCTIONS ARE PERFORMED CONSECUTIVELY
2. AFTER A READ OR WRITE OPERATION IN THE FIRST OR SECOND FUNCTION GROUPS, OTHER FUNCTION #'S CAN BE ACCESSED BY PRESSING THE "SHIFT" KEY REPEATEDLY UNTIL THE DESIRED FUNCTION IS DISPLAYED
3. ACCESS TO THE THIRD FUNCTION GROUP ALWAYS BEGINS WITH FUNCTION # C1. DEPRESS "SHIFT" ONCE TO ACCESS FUNCTION # C-2, TWICE FOR # C-3, ETC.
4. THE LED DISPLAY CONFIRMS THE ACCESSED FUNCTION GROUP WITH THESE PREFIXES:  
PR = GROUP 1 PR. = GROUP 2 C- = GROUP 3
5. SETTINGS MAY BE READ WHILE VFD IS RUNNING OR STOPPED.
6. SETTINGS MAY BE WRITTEN ONLY WHILE VFD IS STOPPED.
7. FIRST AND SECOND FUNCTION GROUP SETTINGS MAY BE READ WHILE IN [EXT OP] MODE.
8. THE [CLEAR] KEY ERASES WRONG KEY ENTRY, CLEARS "ERR" DISPLAY, OR ERASES DISPLAYED ALARM FROM MEMORY.
9. VALUES LESS THAN 1 MUST BE SET USING [0] BEFORE [.]
10. MAXIMUM 4 DIGIT NUMBERS CAN BE ENTERED. IF MORE THAN 4 ARE ATTEMPTED, ONLY THE LAST 4 ARE RECOGNIZED.
11. LAMPS ABOVE [MONITOR], [SET], [EXT OP] AND [PU OP] KEYS ILLUMINATE TO INDICATE WHICH MODE IS ACTIVATED.
12. PARAMETER UNIT MAY BE CONNECTED OR DISCONNECTED WHILE VFD IS RUNNING. VFD COVER MUST BE ON.
13. PARAMETER UNIT CANNOT RESET VFD AFTER A FAULT TRIP. CYCLE MAIN POWER OFF OR APPLY MOMENTARY CONTACT ACROSS RES-SD TO RESET.

# FUNCTION LIST

FUNCTION # (PARAMETER)	FUNCTION	SETTING RANGE	INITIAL SETTING
1 S T  F U N C T I O N	0 TORQUE BOOST (MANUAL)	0-30%	0.4-7.5KW: 6% 11-55KW: 3%
	1 MAX. FREQUENCY LIMIT (1)	0-120 HZ	120 HZ
	2 MIN. FREQUENCY LIMIT (1)	0-60 HZ	0 HZ
	3 V/F (BASE FREQUENCY) (1)	50-360 HZ	60 HZ
	4 MULTI-SPEED SETTING: 1ST (HIGH SPEED) (1)	0-360 HZ	60 HZ
	5 MULTI-SPEED SETTING: 2ND (MIDDLE SPEED) (1)	0-360 HZ	30 HZ
	6 MULTI-SPEED SETTING: 3RD (LOW SPEED) (1)	0-360 HZ	10 HZ
	7 ACCELERATION TIME	0.1-3600 SEC.	0.4-7.5KW: 5 SEC 11-55KW: 15 SEC
	8 DECELERATION TIME	0.1-3600 SEC.	0.4-7.5KW: 5 SEC 11-55KW: 15 SEC
2 N D  F U N C T I O N	9 ELECTRONIC THERMAL RELAY (OVERHEAT)	0-999.9 A	0.4-0.75KW: 85% 1.5-55KW: 100% *
	10 PWM MODE (3)	0-15	3
	11 DC DYNAMIC BRAKE TIME	0-10 SEC.	0.5 SEC
	12 DC DYNAMIC BRAKE VOLTAGE	0-20%	0.4-7.5KW: 8% 11-55KW: 4%
	13 STARTING FREQUENCY (1)	0.5-10 HZ	0.5 HZ
	14 LOAD PATTERN SELECTION (3)	0, 1, 2	0
	15 JOG FREQUENCY (1)	0-360 HZ	5 HZ
	16 JOG ACCELERATION/DECELERATION TIME	0.1-3600 SEC.	0.5 SEC
	17 2ND ACCELERATION/DECELERATION TIME	0.1-3600 SEC.	5 SEC.
	18 HIGH-SPEED MAXIMUM FREQUENCY LIMIT (1)	120-360 HZ	120 HZ
	19 BASE FREQUENCY VOLTAGE (2)	0-500V, 9999	9999
	20 FREQUENCY AT 5V INPUT VOLTAGE (1)	1-360 HZ	60 HZ
	21 STALL PREVENTION LEVEL	0-200%	150%
	22 2ND STALL PREVENTION LEVEL (CURRENT)	0-200%	150%
	23 2ND STALL PREVENTION LEVEL (FREQUENCY) (1)	0-360 HZ	0 HZ
	24 MULTI-SPEED SETTING: 4TH (1) (2)	0-360 HZ, 9999	9999
	25 MULTI-SPEED SETTING: 5TH (1) (2)	0-360 HZ, 9999	9999
	26 MULTI-SPEED SETTING: 6TH (1) (2)	0-360 HZ, 9999	9999
	27 MULTI-SPEED SETTING: 7TH (1) (2)	0-360 HZ, 9999	9999
	28 MULTI-SPEED INPUT CORRECTION (3)	0, 1	0
	29 ACCEL./DECEL. PATTERN SELECTION (3)	0, 1, 2	0
	30 REGENERATIVE BRAKE DUTY	0-30%	**
	31 FREQUENCY JUMP 1A (1) (2)	0-360 HZ, 9999	9999
	32 FREQUENCY JUMP 1B (1) (2)	0-360 HZ, 9999	9999
	33 FREQUENCY JUMP 2A (1) (2)	0-360 HZ, 9999	9999
	34 FREQUENCY JUMP 2B (1) (2)	0-360 HZ, 9999	9999
	35 FREQUENCY JUMP 3A (1) (2)	0-360 HZ, 9999	9999
	36 FREQUENCY JUMP 3B (1) (2)	0-360 HZ, 9999	9999
	37 SPEED DISPLAY (3)	0, 2, 4, 6, 8, 10, 11-9998	0
	38 FM TERMINAL OUTPUT BASE FREQUENCY (1)	1-360 HZ	60 HZ
	39 FREQUENCY AT 20 mA INPUT (1)	1-360 HZ	60 HZ
	40 TORQUE BOOST (AUTOMATIC)	0-200%	0
	41 REVERSE OPERATION (3)	0, 1	0
	42 UP-TO-FREQUENCY SENSITIVITY	1-100%	10%
	43 OUTPUT FREQ. DETECT./PU OPERATION INDICATION(2)	0.5-360 HZ, 9999	6 HZ
	44 OUTPUT FREQ. DETECT. DURING REV. OPERATION (2)	0.5-360 HZ, 9999	9999
	45 DC DYNAMIC BRAKE FREQUENCY (1)	0-60 HZ	3 HZ
	46 EXTERNAL THERMAL RELAY SIGNAL INPUT (3)	0, 1, 100, 101	0
	47 SECOND DECEL. TIME (2)	0.1-3600 SEC, 9999	9999
	48 SECOND TORQUE BOOST (2)	0-30%, 9999	9999
	49 SECOND V/HZ (1) (2)	50-360 HZ, 9999	9999
	66 CUSHION VOLTAGE TIME (4)	0.1-5 SEC	0.5 SEC
	67 RESET TIME (2) (4)	0.1-5 SEC, 9999	VAIRES W/SIZE
	77 PARAMETER "WRITE" PROHIBITION (3)	0, 1	0
	78 REVERSING PREVENTION (3)	0, 1	0
	79 OPERATION MODE SELECTION (3)	0, 1, 2	0
3 R D  F U N C T I O N	C-1 FREQUENCY METER CALIBRATION (1)	0-360 HZ	60 HZ
	C-2 BIAS FOR FREQUENCY REFERENCE VOLTAGE SIGNAL	0-120 HZ	0 HZ
	C-3 GAIN FOR FREQUENCY REFERENCE VOLTAGE SIGNAL	1-360 HZ	60 HZ
	C-4 BIAS FOR FREQUENCY REFERENCE CURRENT SIGNAL	0-120 HZ	0 HZ
	C-5 GAIN FOR FREQUENCY REFERENCE CURRENT SIGNAL	1-360 HZ	60 HZ

\* % OF RATED OUTPUT AMPS

\*\* = 200V, 0.4-3.7K - 3% / 200V, 5.5-7.5K - 2% / 400V, 2.2-7.5K - 2%

SEE PAGE 4 FOR FUNCTION NOTES (1) - (4)

## LEAST SETTING INCREMENTS

FREQUENCY	0.01 HZ	CURRENT	0.1A
TIME	0.1 SEC	%	1%
VOLTAGE	1V		

## NOTES

- (1) ALL FUNCTIONS LISTED WITH SETTING RANGE IN HZ AUTOMATICALLY CHANGE SCALE TO THE UNITS SELECTED BY FUNCTION 37, EXCEPT C-2 TO C-5.
- (2) **FUNCTION SETTING 9999 CAUSES:**
- |       |   |
|-------|---|
| 19    | MAX. OUTPUT VOLTAGE EQUALS SUPPLY VOLTAGE                   |
| 24-27 | 4TH, 5TH, 6TH, OR 7TH MULTI-SPEED SETTING NOT SELECTABLE    |
| 31-36 | FREQUENCY JUMP SETTING(S) NOT SELECTED                      |
| 43    | TERMINAL FU INDICATES "PU OPERATION" MODE                   |
| 44    | FREQUENCY DETECTION SIGNAL AT SAME FREQUENCY AS FUNCTION 43 |
| 47-49 | FUNCTION NOT SELECTED                                       |
| 67    | FR-ZNS FUNCTION NOT SELECTED                                |
- (3) **FUNCTION SETTING DEFINITIONS**
- |    |  |  |   |
|----|--|--|---|
| 10 | SETTINGS 0-15 CHANGE PWM CARRIER FREQUENCY AND PATTERNS. SELECT BY TRIAL AND ERROR FOR MINIMUM NOISE AND VIBRATION   |  |   |
| 14 | 0-CONSTANT TORQUE<br>1-REDUCED TORQUE<br>2-CONSTANT TORQUE AND TORQUE BOOST DISABLED DURING REVERSE OPERATION  |  |   |
| 28 | CIRCUIT ENABLING EXTERNAL VOLTAGE SIGNAL TO BIAS MULTI-SPEED SETTINGS<br>0 - CIRCUIT ENABLED<br>1 - CIRCUIT DISABLED   |  |   |
| 29 | 0 - LINEAR ACCEL/DECEL<br>1 - S-CURVE ACCEL/DECEL RAMP FROM 0 TO BASE SPEED<br>2 - S-CURVE ACCEL/DECEL RAMP FOR ANY SPEED CHANGE INCREMENT   |  |   |
| 37 | <b>SETTING</b>   | <b>SETTING UNITS</b>                                       | <b>DIGITAL DISPLAY</b>                          |
|    | 0  | NONE   | OUTPUT FREQUENCY IN HZ IS DISPLAYED             |
|    | 2,4,6,8, OR 10   | NUMBER OF MOTOR POLES                                      | MOTOR SPEED IN RPM                              |
|    | 11 TO 9998   | CUSTOMER DEFINED UNITS<br>CORRESPONDING TO 60 HZ<br>OUTPUT | MACHINE SPEED OR FLOW RATE (FPM, GPM, CFM, ETC) |
| 41 | CIRCUIT ENABLING VFD TO OPERATE IN REVERSE BY APPLYING A NEGATIVE SPEED REFERENCE VOLTAGE SIGNAL<br>0 - CIRCUIT DISABLED<br>1 - CIRCUIT ENABLED  |  |   |
| 46 | 0 - JOG/OH TERMINAL TO BE USED FOR JOG CIRCUIT, CONNECTION ACROSS MRS-SD SHUTS OFF VFD<br>1 - JOG/OH TERMINAL TO BE USED FOR THERMAL RELAY, CONNECTION ACROSS MRS-SD SHUTS OFF VFD<br>100 - JOG/OH TERMINAL TO BE USED FOR JOG CIRCUIT, OPEN ACROSS MRS-SD SHUTS OFF VFD<br>101 - JOG/OH TERMINAL TO BE USED FOR THERMAL RELAY, OPEN ACROSS MRS-SD SHUTS OFF VFD |  |   |
| 77 | 0 - WRITING OF ALL PARAMETERS IS PERMITTED<br>1 - WRITING OF ALL PARAMETERS EXCEPT 77 AND 79 IS PROHIBITED   |  |   |
| 78 | 0 - REVERSE MOTORING IS PERMITTED<br>1 - REVERSE MOTORING IS PROHIBITED  |  |   |
| 79 | 0 - OPERATION IN [PU OP] OR [EXT OP] MODES IS PERMITTED<br>1 - OPERATION IN [PU OP] MODE ONLY IS PERMITTED<br>2 - OPERATION IN [EXT OP] MODE ONLY IS PERMITTED   |  |   |
- (4) FUNCTIONS 66 AND 67 EXIST ONLY IN MODELS 200V, 15KW AND LARGER AND 400V, 11KW AND LARGER OR IN SMALLER MODELS WITH THE FR-ZNS OPTION INSTALLED

## ALARM DISPLAY

ALL ALARM CONDITIONS CAUSE A VFD SHUTDOWN AND ARE DISPLAYED AUTOMATICALLY.

CODE	DESCRIPTION	CODE	DESCRIPTION
EOC1	OUTPUT CURRENT EXCEEDED THE OVERCURRENT LIMIT DURING ACCELERATION	EOC2	OUTPUT CURRENT EXCEEDED THE OVERCURRENT LIMIT DURING CONSTANT-SPEED OPERATION
EOC3	OUTPUT CURRENT EXCEEDED THE OVERCURRENT LIMIT DURING DECELERATION	EOVT	BRAKING REGENERATIVE POWER FROM MOTOR EXCEEDED THE REGENERATIVE OVERVOLTAGE LIMIT
ETHM	ELECTRONIC THERMAL RELAY WAS ACTIVATED BELOW 150% OF PRESET CURRENT	ETHT	ELECTRONIC THERMAL RELAY WAS ACTIVATED OVER 150% OF PRESET CURRENT
EIPF	INSTANTANEOUS POWER FAILURE	EPIN	OVERTEMPERATURE OF TRANSISTOR HEATSINK
EBE	BRAKE TRANSISTOR FAILURE	EOLT	STALL PREVENTION FUNCTION BROUGHT THE MOTOR TO A STOP
EPE	MEMORY WAS DAMAGED	EUVT	INPUT VOLTAGE FELL BELOW THE SPECIFIED LIMIT
EGF	OUTPUT GROUND FAULT	EOHT	EXTERNALLY INSTALLED THERMAL RELAY WAS ACTIVATED
EOPT	A PLUG-IN OPTION CONNECTION FAILED		

Number	0	1	2	3	4	5	6	7	8	9
Display	0	1	2	3	4	5	6	7	8	9
Letter	A	B	C	E	F	G	H	I	J	L
Display	R	b	c	e	f	G	H	I	J	L
Letter	M	N	O	P	R	T	U	V	-	
Display	n	n	0	P	r	r	U	u	-	