



Operation & Maintenance Manual

NR14K

NR14KE

NR14XE

NR16K

NR16KN

NR20K

NR25KH

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7 PEDAL BRAKING

- ANALOG: the mechanical brake pedal has a switch and a potentiometer installed. When the accelerator is released and the pedal brake is pushed the inverter performs an electrical braking whose intensity is proportional to the brake pedal potentiometer. The minimum intensity is established by the "Release braking" parameter, when the brake pedal is slightly pressed (brake switch close but brake potentiometer at the minimum). The maximum intensity is established by the "Pedal braking" parameter when the brake pedal is fully pressed (brake potentiometer at the maximum). In the middle positions, the electrical braking intensity is a linear function between minimum and maximum intensity.
- DIGITAL: The truck does not have a potentiometer installed on the mechanical brake pedal, but only a microswitch; when the accelerator pedal is released and the brake pedal is pushed (brake switch closed), the inverter performs an electrical braking following "Pedal braking" parameter.

8 SET TEMPERATURE

- DIGITAL: a digital (ON/OFF) motor thermal sensor is connected to F6 input.
- ANALOG: an analog motor thermal sensor is connected to F6 (the curve can be customized on a customer request).
- NONE: no motor thermal sensor switch is connected.

SUBMENU "ADJUSTEMENT"

- 1 SET POT BRK MIN: records the minimum value of braking pedal potentiometer when the braking pedal switch is closed; the procedure is similar to the "Program Vacc" function (see chapter 5.4). This procedure must be carried out only if the "Pedal braking" option is programmed as "Analog".
- 2 SET POT BRK MAX: records the maximum value of braking pedal potentiometer when the braking pedal is fully pressed; the procedure is similar to the "Program Vacc" function (see chapter 5.4). This procedure must be carried out only if the "Pedal braking" option is programmed as "Analog".
- 3 SET BATTERY TYPE: selects the nominal battery voltage;
- 4 ADJUST BATTERY: fine ajustement of the battery voltage measured by the controller.
- 5 ADJUSTMENT #04: this parameter determines the motor temperature level at which the "Motor temperature" alarm is signalled. The range is from 70°C to 160°C with 10°C steps. This parameter must be adjusted only if the "Set temperature" (menu "Set option") parameter is programmed "Analog".

CAT Rev. 11
Controller: ZAPI AC-2 PUMP INVERTER 48V 350A Date 15.02.05
Program version: ACRO0.16
Zapi's serial number from:

CONFIG MENU

SET MODEL NOT AVAILABLE

SET OPTIONS

HOURLY COUNTER	RUNNING
BATTERY CHECK	OFF
SET TEMPERATURE	ANALOG

ADJUSTMENTS

SET BATTERY TYPE	V	48
ADJUST BATTERY	V	BATTERY VOLTAGE
THROTTLE 0 ZONE	%	11
THROTTLE X POINT	%	63
THROTTLE Y POINT	%	36
ADJUSTMENT #04	°	120
ADJUSTMENT #03	°	55

MAIN MENU

PARAMETER CHANGE

ACCELER. DELAY	0	1	2	3	4	5	6	7	8	9
DECELER. DELAY	0	1	2	3	4	5	6	7	8	9
MAX SPEED UP	Hz	110								
MIN SPEED UP	Hz	0								
MAXIMUM CURRENT	0	1	2	3	4	5	6	7	8	9

CAT Rev. 9
Controller: ZAPI AC-2 TRACTION INVERTER 48V 3 Date 15.02.05
Program version: AC2R00.16
Zapi's serial number from:

CONFIG MENU

SET MODEL

CONNECTION	1	2	5	6	9
	SICOS	TR	PU	EPS	RIO

SET OPTIONS

HOUR COUNTER	RUNNING
BATTERY CHECK	ON
CUTBACK MODE	ABSENT
HYDRO KEY ON	OFF
STOP ON RAMP	OFF
AUX OUTPUT #1	BRAKE
PEDAL BRAKING	DIGITAL
SET TEMPERATURE	ANALOG

ADJUSTMENTS

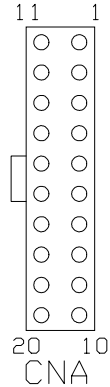
SET BATTERY TYPE	V	48
ADJUST BATTERY	V	BATTERY VOLTAGE
THROTTLE 0 ZONE	%	7
THROTTLE X POINT	%	63
THROTTLE Y POINT	%	36
ADJUSTMENT #04	°	120
ADJUSTMENT #03	°	35
ADJUSTMENT #02		3
ADJUSTMENT #01		3

MAIN MENU

PARAMETER CHANGE

ACCELER. DELAY I	0	1	2	3	4	5	6	7	8	9
ACCELER. DELAY II	0	1	2	3	4	5	6	7	8	9
ACCELER. DELAY III	0	1	2	3	4	5	6	7	8	9
RELEASE BRAKING I	0	1	2	3	4	5	6	7	8	9
RELEASE BRAKING II	0	1	2	3	4	5	6	7	8	9

8.2 CNA CONNECTOR



TAB.	A	CONN.	CODE
1		NPOT	
2		PPOT	
3		CANH	
4		CANH	
5		FWD	
6		VCC	
7		GND	
8		GND	
9		PPOC	
10		QLS	
11		CPOT	
12		K3	
13		CANL	
14		CANL	
15		REV	
16		CHA	
17		CHB	
18		INDIC	
19		PPOC2	
20		DLS	

- | | | |
|---|------|--|
| 1 | NPOT | This is the lower voltage connection for the steer feedback potentiometer. It's internally connected to GND through a 470 Ohms resistance. |
| 2 | PPOT | This is the higher voltage connection for the steer feedback potentiometer. It's internally connected to a 5Vdc reference through a 470 Ohms resistance . |
| 3 | CANH | This is the high reference of the CAN interface. |
| 4 | CANH | Same of pin #3. Pin #3 and #4 are internally connected together. |
| 5 | FWD | A request to travel in the Drive Unit direction must provide a signal on this input, either at battery positive or battery negative. Either level may be selected configuring Jumper J2. |
| 6 | VCC | Optional encoder supply. When an encoder is used it may be supplied through this pin. The output voltage is selected through the jumper J8 (see. 5). |
| 7 | GND | This is internally connected to ground (battery minus) reference. It may be used for the GND reference of the optional encoder or for the stepper motor (manual command device). |
| 8 | GND | This is internally connected to ground (battery minus) reference. It may be used for the GND reference of the steer angle direction Led gauge. |
| 9 | PPOC | Not Used. This is the higher voltage connection for a handwheel set point potentiometer. This steering option requires modifications on the logic card and cannot be carried out when a tachogenerator or a stepper motor card is chosen. This pin is internally connected to a 5Vdc reference through a 470 Ohms resistance. |

CAT

Controller: ZAPI EPS AC 48V 40A (50A)
Program version: EPS AC ST RO 1.02-1.03
Zapi's serial number from:

Rev. 6
Date 15.02.05

CONFIG MENU

SET MODEL

CONNECTED TO	(6)
SYSTEM CONFIG	0

SET OPTIONS

HOUR COUNTER	RUNNING
MICRO CHECK	PRESENT
ENCODER CONTROL	OFF
FEEDBACK DEVICE	OPTION #1
LIMIT DEVICE	OFF
DIRECTION GAUGE	OPTION #1
AUTO INPUT ACTIV	1
AUX FUNCTION	0

ADJUSTMENTS

ADJUSTMENT #01		0	
SET CURRENT		0	
ADJUSTMENT #02		100,0	
ADJUSTMENT #03	%	(106,6)	FACTORY ADJUSTED
ADJUSTMENT #04	%	(113,3)	FACTORY ADJUSTED
SET BATTERY TYPE	V	48	
SET SAT. FREQ.	Hz	100,0	
OVERSAT FREQ.	Hz	1	
MAXIMUM SLIP	Hz	5,00	
ZERO SP POT	V	2,5	
SET STEER 0-POS.	mV	2500	
SET MIN FB POT	V	0,4	
SET MAX FB POT	V	4,4	
AUX VOLTAGE #1	mV	2500	AUTO ADJUSTED

6.5 DESCRIPTION OF PROGRAMMABLE FUNCTIONS (OPTIONS)

The options can be set on the "SET OPTIONS" Menu.

<i>Function</i>	<i>Option</i>	<i>Meaning</i>
1) EV2 TYPE	OPTION1	Set EV2 to ON-OFF valve type.
	OPTION2	Set EV2 to PROPORTIONAL valve type.
1) EV1 TYPE	OPTION1	Set EV1 to ON-OFF valve type.
	OPTION2	Set EV1 to PROPORTIONAL valve type.
1) EV3 TYPE	OPTION1	Set EV3 to ON-OFF valve type.
	OPTION2	Set EV3 to PROPORTIONAL valve type.
1) EV4 TYPE	OPTION1	Set EV4 to ON-OFF valve type.
	OPTION2	Set EV4 to PROPORTIONAL valve type.
1) EV5 TYPE	OPTION1	Set EV5 to ON-OFF valve type.
	OPTION2	Set EV5 to PROPORTIONAL valve type.
1) EV6 TYPE	OPTION1	Set EV6 to ON-OFF valve type.
	OPTION2	Set EV6 to PROPORTIONAL valve type.
1) EV7 TYPE	OPTION1	Set EV7 to ON-OFF valve type.
	OPTION2	Set EV7 to PROPORTIONAL valve type.
1) EV8 TYPE	OPTION1	Set EV8 to ON-OFF valve type.
	OPTION2	Set EV8 to PROPORTIONAL valve type.
1) SET INPUT #1	OPTION1	Set pin A8 as ZERO ENCODER.
	OPTION2	Set pin A11 as ZERO ENCODER.

CAT

Controller: ZAPI MHYRIO 48V
Program version: MHYRIO RO 1.07
Zapi's serial number from:
Valve: Buchholz

Rev. 11
Date 02.15.05

CONFIG MENU

SET MODEL

SET OPTIONS

LIFT TYPE		OPTION #2
LOWER TYPE		OPTION #2
REACH FWD TYPE		OPTION #2
REACH BWD TYPE		OPTION #2
TILT UP TYPE		OPTION #2
TILT DW TYPE		OPTION #2
SHIFT RGT TYPE		OPTION #2
SHIFT LFT TYPE		OPTION #2

ADJUSTMENTS

MAIN MENU

PARAMETER CHANGE

MIN LIFT		30	255
MIN LOWER	A	33 0,15	255
MIN REACH FWD		30	255
MIN REACH BWD		30	255
MIN TILT UP		30	255
MIN TILT DW		30	255
MIN SHIFT RGT		30	255
MIN SHIFT LFT		30	255
MAX LIFT	A	160	255
MAX LOWER	A	120 0,61	150 0,77
MAX REACH FWD		160	255
MAX REACH BWD		160	255
MAX TILT UP		160	255
MAX TILT DW		160	255

Defaults

Full Version Available

Caterpillar NR16KC Reach Truck Operator Manual (WHOMM0029)

Caterpillar NR16KC Reach Truck operator manual, covers controls, inspections, load handling, and battery safety. Downloadable PDF format.

VIEW THE FULL MANUAL