ir33 smart - IR33C7HB0E electronic controller for normal and low temperature ventilated refrigeration units

LEGGI E CONSERVA QUESTE ISTRUZIONI
READ AND SAVE THESE INSTRUCTIONS

CAREL

READ CAREFULLY IN THE TEXT!

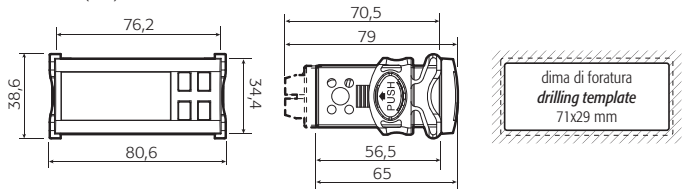
- Electronic controller for normal and low temperature ventilated refrigeration units
- 115/230 Vac switching power supply
- 16 A compressor relay
- Management of NTC (-50 to +90°C) and PTC (-50 to +150°C) sensors
- Simple and intuitive installation and configuration
- 6 pre-loaded configurations for the most common refrigeration applications
- HACCP reports
- Real time clock

READ ME NOW!!!

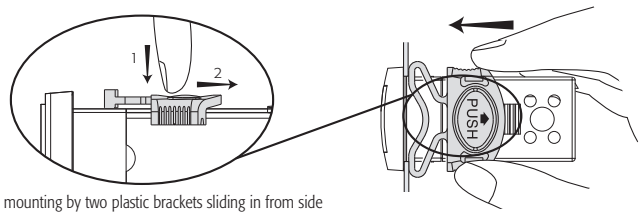
With reference to the label on the rear of the instrument and the required application

1. Check that power supply, probes and loads (compressor, heaters, etc.) are suitable for the instrument.
2. Fasten the instrument to the panel as shown in the following figure.
3. Make all the required electrical connections.
4. Power up the unit.
5. After around 2 seconds, if the instrument displays the temperature read by the probes connected to the device, go directly to point 7. If nothing is displayed or an alarm is signalled (alarm codes on the display), power down, check the connections and the power supply and go to point 6.
6. Power the unit up again. If the instrument now correctly displays the temperature, go to point 7. If, on the other hand, the problem described in point 5 is repeated, see the table "Alarms and signals: display, buzzer and relay" to identify the cause of the problem.
7. ir33 smart is now ready to be configured. For correct configuration based on the required application, see the section "How to select and load a configuration".

Dimensions (mm)

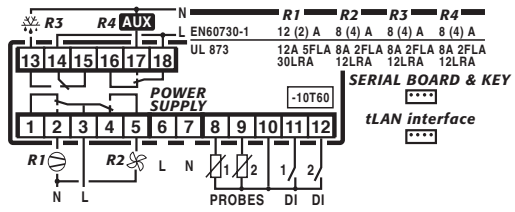


Wall mounting ir33

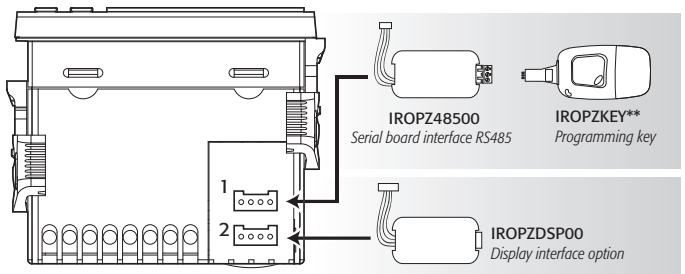


Wall mounting by two plastic brackets sliding in from side

Wiring diagram



Optional connections



READ CAREFULLY IN THE TEXT!

IMPORTANT: separate the probe and digital input cables from the cables to inductive loads and power cables to avoid electromagnetic disturbance. Never run power cables (including electrical panel cables) and signal cables in the same conduits.

How to select and load a user configuration

Step	Action	Effect	Meaning
1	Switch the instrument on while holding *Prg* mute	After 2 seconds the display shows the message **'bn0'**	**'bn0'** is the current configuration. (Standard CAREL when first switched on or other user configuration, if loaded)
2	Press ▲ aux or def ▼	The display shows the messages **'bn1'**, **'bn2'**, **'bn3'**, **'bn4'**, **'bn5'**, **'bn6'**	Select the required configuration (refer to the following table)
3	Press ***Set***	The display shows **"Std"** for 1 sec	The user configuration selected in point 2 will be loaded

This procedure can only be performed once: the most suitable configuration for the application, once loaded, will remain active the next time the instrument is started.
When switching on the first time, bn0 corresponds to the Carel standard (default configuration). The procedure for loading one of the user configurations involves copying one of the sets of parameters (bn1,...,bn6) to bn0. bn0 therefore always corresponds to the last configuration loaded.

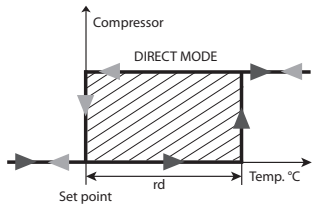
Configurations

ir33 SMART is loaded with 6 default configurations (sets of parameters). Each configuration identifies a specific refrigeration application, and can be identified simply by the index (bn*) when switching the instrument on.

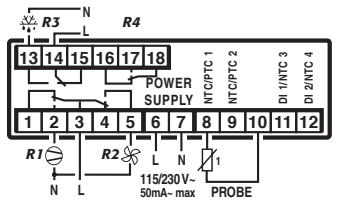
Index	Application	Op. T. range	Inputs	Relay outputs
bn1	Normal temperature ventilated refrigeration units with heater defrost (timed)	**2T10°C**	NTC room	Compressor Defrost Fans
bn2	Normal temperature ventilated refrigeration units with heater defrost (by temperature) and light control	**2T10°C**	NTC room NTC evaporator DI door switch	Compressor Defrost Fans Light
bn3	Normal or low temperature ventilated refrigeration units with heater defrost (by temperature) and light control	**-20T-14°C** **2T10 °C**	NTC room NTC evaporator DI door switch	Compressor Defrost Fans Light
bn4	Normal temperature ventilated refrigeration units with heater defrost (with two evaporators, by temperature)	**2T10°C**	NTC room NTC evaporator 1 NTC evaporator 2	Compressor Defrost Evap fans 1 Evap fans 2
bn5	Normal or low temperature ventilated refrigeration units with heater defrost (with two evaporators, by temperature)	**-20T-14°C** **2T10 °C**	NTC room NTC evaporator 1 NTC evaporator 2	Compressor Defrost Evap fans 1 Evap fans 2
bn6	Standard CAREL (default config.)	**-50T90 °C**	configurable	configurable

bn1: normal temperature (+2T10 °C) ventilated refrigeration units with heater defrost (timed) - Temperature range: 2T10 °C

Temperature control



Connection diagram



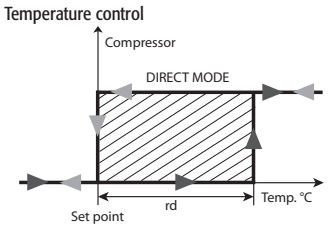
Inputs	Room probe		NTC 1	
Outputs	Compressor		R1: 16 A relay	
	Defrost heater		R3: 8 A relay	
	Evaporator fan		R2: 8 A relay	
Main parameters (type F)	Name	Type	Description	Default value
	St	CtL	Set point	4 °C
	rd		Control differential (hysteresis)	2 °C
	dI	dEF	Interval between defrosts	8 hours
	dP1		Maximum evap. defrost duration	30 min
	AL (*)	ALM	Minimum temperature alarm	-30 °C
	AH (*)		Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0	FAn	Fan management	0
	Fd		Fans off after dripping	0 min

(*) alarm thresholds AL & AH absolute. Relay R4 is not used.

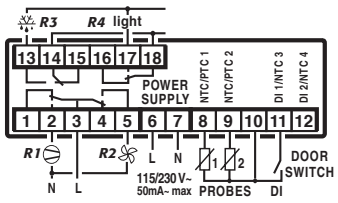
bn2: normal temperature (+2T10 °C) ventilated refrigeration units with heater defrost (by temperature) and light control

Temperature range: 2T10 °C

Temperature control



Connection diagram



*: short-circuit terminals 10 and 11 if the door switch is not used

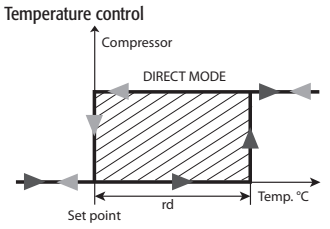
Inputs	Room probe		NTC 1	
	Defrost probe		NTC 2	
	Door switch		Digital input DI1	
Outputs	Compressor		R1: 16 A relay	
	Defrost heater		R3: 8 A relay	
	Evaporator fan		R2: 8 A relay	
	Light		R4: 8 A relay	
Main parameters (type F)	Name	Type	Description	Default value
	St	CtL	Set point	2 °C
	rd		Control differential (hysteresis)	2 °C
	dI	dEF	Interval between defrosts	6 hours
	dt1		Evaporator end defrost temperature	4 °C
	dd		Dripping time	2 min
	d/1		Defrost probe 1 reading	-
	AL (*)	ALM	Minimum temperature alarm	-30 °C
	AH (*)		Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0	FAn	Fan management	0
	F1		Fan on temperature	5 °C
	Fd		Fans off after dripping	2 min

(*) absolute alarm thresholds

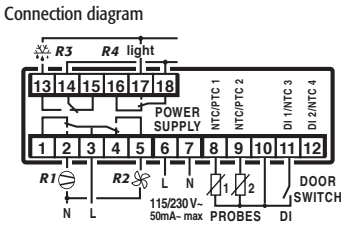
bn3: normal (+2T10 °C) or low temperature (-20T-14 °C) ventilated refrigeration units with heater defrost (by temperature) and light control

Temperature range -20T-14 °C & +2T10 °C

Temperature control



Connection diagram



*: short-circuit terminals 10 and 11 if the door switch is not used

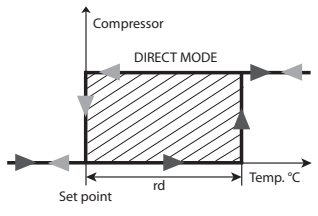
Inputs	Room probe		NTC 1	
	Defrost probe		NTC 2	
	Door switch		Digital input DI1	
Outputs	Compressor		R1: 16 A relay	
	Defrost heater		R3: 8 A relay	
	Evaporator fan		R2: 8 A relay	
	Light		R4: 8 A relay	
Main parameters (type F)	Name	Type	Description	Default value
	St	CtL	Set point	-14 °C
	rd		Control differential (hysteresis)	2 °C
	dI	dEF	Interval between defrosts	6 hours
	dt1		Evaporator end defrost temperature	4 °C
	dd		Dripping time	2 min
	d/1		Defrost probe 1 reading	-
	AL (*)	ALM	Minimum temperature alarm	-50 °C
	AH (*)		Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0	FAn	Fan management	0
	F1		Fan on temperature	5 °C
	Fd		Fans off after dripping	2 min

(*) absolute alarm thresholds

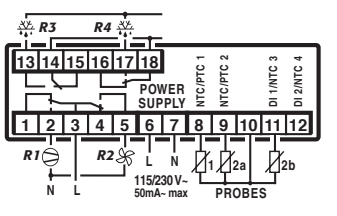
bn4: normal temperature ventilated refrigeration units (+2T10 °C) with heater defrost (by temperature) and two evaporators

Temperature range +2T10 °C

Temperature control



Connection diagram

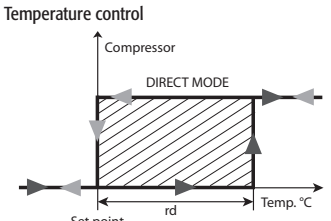


Inputs	Room probe		NTC 1	
	Defrost probe 2a		NTC 2	
	Defrost probe 2b		NTC 3	
Outputs	Compressor		R1: 2 HP relay	
	Defrost heater 1		R3: 8 A relay	
	Defrost heater 2		R4: 8 A relay	
	Evaporator fan		R2: 8 A relay	
Main parameters (type F)	Name	Type	Description	Default value
	St	CtL	Set point	2 °C
	rd		Control differential (hysteresis)	2 °C
	dI	dEF	Interval between defrosts	6 hours
	dt1		Evaporator end defrost temperature	4 °C
	dt2		AUX evaporator end defrost temp.	4 °C
	dP1		Maximum evaporator defrost duration	30 min
	dd		Dripping time	2 min
	d8		Alarm bypass time after defrost and/or door open	1 hour
	d/1		Defrost probe 1 reading	-
	d/2		Defrost probe 2 reading	-
	AL	ALM	Minimum temperature alarm	0 °C
	AH		Maximum temperature alarm	0 °C
	Ad		Temperature alarm delay	120 min
	F1	FAn	Fan on temperature	5 °C
	Fd		Fans off after dripping	1 min

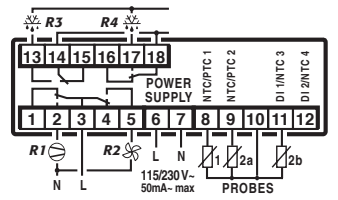
bn5: normal (+2T10 °C) or low temp. (-20T-14 °C) ventilated refrigeration units with heater defrost (by temperature) & two evaporators

Temperature range -20T-14 °C & +2T10 °C

Temperature control



Connection diagram

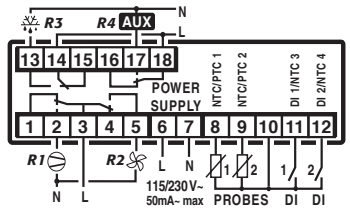


Inputs	Room probe		NTC 1	
	Defrost probe 2a		NTC 2	
	Defrost probe 2b		NTC 3	
Outputs	Compressor		R1: 2 HP relay	
	Defrost heater 1		R3: 8 A relay	
	Defrost heater 2		R4: 8 A relay	
	Evaporator fan		R2: 8 A relay	
Main parameters (type F)	Name	Type	Description	Default value
	St	CtL	Set point	-14 °C
	rd		Control delta	2 °C
	dI	dEF	Interval between defrosts	6 hours
	dt1		Evaporator end defrost temperature	4 °C
	dt2		AUX evaporator end defrost temp.	4 °C
	dd		Dripping time	2 min
	d/1		Defrost probe 1 reading	-
	d/2		Defrost probe 2 reading	-
	AL (*)	ALM	Minimum temperature alarm	-50 °C
	AH (*)		Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0	FAn	Fan management	0
	F1		Fan on temperature	5 °C
	Fd		Fans off after dripping	2 min

(*) absolute alarm thresholds

bn6: standard CAREL (default configuration)

Connection diagram



Main parameters (type F)	Name	Type	Description	Default value
	St	CtL	Set point	-14 °C
	rd		Control delta	2 °C
	rt		Temperature monitoring interval	-
	rH		Maximum temperature read	-
	rL		Minimum temperature read	-
	dI	dEF	Interval between defrosts	8 hours
	dt1		Evaporator end defrost temperature	4 °C
	dt2		AUX evaporator end defrost temp.	4 °C
	dP1		Maximum evaporator defrost duration	30 min
	dP2		Maximum evaporator defrost duration	30 min
	dd		Dripping time	2 min
	d8		Alarm bypass time after defrost and/or door open	1 hour
	d/1		Defrost probe 1 reading	-
	d/2		Defrost probe 2 reading	-
	AL	ALM	Minimum temperature alarm	0 °C
	AH		Maximum temperature alarm	0 °C
	Ad		Temperature alarm delay	120 min
	F1	FAn	Fan on temperature	5 °C
	Fd		Fans off after dripping	1 min

Indications on the display

When flashing, the signals on the display indicate a request that cannot be implemented until the delay timers have expired.

Icon	Function	Normal operation			Startup
		ON	OFF	Flashing	
	COMPRESS.	compressor on	compress. off	compress. call	
	FAN	fan on	fan off	fan call	
	DEFROST	defrost in progress	no defrost call	defrost call	
AUX	AUX	AUX auxiliary output active	AUX auxiliary output not active	anti-sweat heater function active	
	ALARM	delayed external alarm (before the time "A7"has elapsed)	no alarm present	alarms in norm. operation (e.g. high/low temp.) or immediate or delayed ext. alarm from digital input	
	CLOCK	if at least one timed defrost has been set	no timed defrost has been set	clock alarm	ON if Real-Time Clock present
	LIGHT	light auxiliary output active	light auxiliary output not active	anti-sweat heater function active	
	SERVICE		no malfunction	malfunction (e.g. EEPROM error or faulty probes)	
HACCP	HACCP	function enabled (HA and/or HF)	function not enabled	HACCP alarm saved	
	CONT. CYCLE	function activated	function not activated	function called	

Buttons on the keypad

But.	Pressing the button alone	Pressing together with other buttons		
Prg mute	• if pressed for more than 5 s, accesses the menu for setting the type F parameters (frequent) • in the event of alarms: mutes the audible alarm (buzzer) and deactivates the alarm relay	• if pressed with SET for more than 5s, accesses the menu for setting type C parameters (configuration) or downloading the parameters • if pressed together with UP/AUX for more than 5s resets any alarms with manual reset	Start-up: if pressed for more than 5 s at start-up activates the RESET procedure	Automatic address assignment: if pressed for more than 1 s enters the automatic serial address assignment procedure
▲ aux	if pressed for more than 1 s, activates /deactivates the auxiliary output	• if pressed together with DOWN/DEF for more than 5s, activates/deactivates the continuous cycle • if pressed with SET for more than 5s starts the report printing procedure (function available but to be implemented) • if pressed with PRG/MUTE for more than 5s, resets any alarms with manual reset		
def ▼	if pressed for more than 5 s, activates /deactivates a manual defrost	• if pressed together with UP/AUX for more than 5s activates/deactivates the continuous cycle • if pressed for more than 1 s with SEL, displays a submenu with the HACCP alarm parameters (HA, HAn, HF, HFn)		
Set	if pressed for more than 1 s, displays and/or sets the set point	• if pressed with PRG/MUTE for more than 5s, accesses the menu for setting type C parameters (configuration) or downloading the parameters • if pressed for more than 1 s with DOWN/DEF, displays a submenu with the HACCP alarm parameters (HA, HAn, HF, HFn) • if pressed with UP/AUX for more than 5s starts the report printing procedure (function available but to be implemented)		

How to set the set point

Step	Action	Effect	Meaning
1	Press ***Set*** for 2 seconds	After 2 seconds the display will show the current set point	This the currently active control set point
2	Press ▲ aux or def ▼	The value on the display will increase or decrease	Set the desired value
3	Press ***Set***	The controller will show the temp.read by the probes again	The set point is modified and saved

Another way of changing the set point is to set parameter "St" (see the tables below)

How to access and set type "F" parameters (FREQUENT, not protected by password)

Step	Action	Effect	Meaning
1	Press Prg/mute for 5 seconds	After 5 seconds the display will show the 1st parameter, "St" (set point)	Access to type "F" parameters is direct
2	Press ▲/aux or def/▼	The display will scroll the list of type "F" parameters (FREQUENT) (depends on the configuration loaded)	Select the desired parameter
3	Press **Set**	The display will show the value of the selected parameter	This is the current value of the parameter
4	Press ▲/aux or def/▼	The value on the display will increase or decrease	Set the desired value
5	Press **Set**	The display will show the parameter name again	IMPORTANT: parameters not yet saved
6	Repeat steps 2, 3, 4 & 5 for all parameters required		
7	Press for 5 seconds Prg/mute	The controller will display the temperature read by the probes again	IMPORTANT: only now have all the parameters been updated

How to access and set type "C" parameters (CONFIGURATION, password protected)

Step	Action	Effect	Meaning
1	Press Prg/mute & **Set** for 5 seconds	After 5 seconds the display shows "0"	Access to type "C" parameters requires the password
2	Press ▲/aux or def/▼	The value on the display will increase or decrease	Enter the password "22"
3	Press **Set**	The display will show the first parameter in the list (depends on the configuration loaded)	The type "C" parameters also include type "F"
4	Press ▲/aux or def/▼	The display will scroll the list of type "C" parameters (CONFIGURATION)	Select the desired parameter
5	Press **Set**	The display will show the value of the selected parameter	This is the current value of the parameter
6	Press ▲/aux or def/▼	The value on the display will increase or decrease	Set the desired value
7	Press **Set**	The display will show the parameter name again	IMPORTANT: parameters not yet saved
8	Repeat steps 4, 5, 6 & 7 for all parameters required		
9	Press Prg/mute for 5 seconds	The controller will display the temperature read by the probes again	IMPORTANT: only now have all the parameters been updated

For both types of access (type "F" and type "C") there is a timeout (no button on the keypad pressed for 1 min), the procedure is ended without saving the parameter.

Accessing the parameters divided by functional blocks (allows the user to scroll the list of parameters in blocks)

Once having accessed the type "F" or "C" parameters (see tables above)

Step	Action	Effect	Meaning
1	Press Prg/mute	The display will show the name of the functional block that the parameter belongs to	Example 'CMP' for the compressor parameters, 'dEF' for the defrost parameters
2	Press ▲/aux or def/▼	The display will show the name of the other functional blocks	Example 'Fan' for the fan parameters
3	Press Prg/mute	The display will show the name of the first parameter in the functional block selected	Example "F0" for 'Fan'

Technical specifications

	Voltage	Power			
Power supply	115-230 V~, 50/60 Hz	6 VA, 50 mA ~ max.			
Insulation guaranteed by the power supply	insulation from very low voltage parts	reinforced - 6 mm in air, 8 mm on surface, 3750 V insulation			
	insulation from relay outputs	basic 3 - mm in air, 4 mm on surface, 1250 V insulation			
Inputs	S1 (probe 1)	NTC & PTC			
	S2 (probe 2)	NTC & PTC			
	DI1 S3 (probe 3)	voltage-free contact, contact resistance <10 Ω, closing current 6 mA NTC & PTC			
	DI1 S3 (probe 4)	voltage-free contact, contact resistance <10 Ω, closing current 6 mA NTC & PTC			
	Maximum distance of probes and digital inputs less than 10 m Note: in the installation keep power supply and load connections separate from probe, digital input, repeater display and supervisor cables.				
Type of probe	Std. CAREL NTC	10 kΩ at 25 °C, range -50T90 °C			
		meas. error	1 °C in range -50T50 °C 3 °C in range 50T90 °C		
	High temperature NTC	50 kΩ at 25 °C, range -40T150 °C			
		meas. error	1.5 °C in range -20T115 °C 4 °C in range outside of -20T115 °C		
	Std. CAREL PTC	985 Ω at 25 °C, range -50T150 °C			
		meas. error	2 °C in range -50T50 °C 4 °C in range 50T150 °C		
Relay outputs	according to the model				
		EN60730-1		UL873	
	relay	250 V~	operating cycles	250 V~	operating cycles
	R2, R3, R4	8 (4) A N.O.	100,000	8 A resistive 2 FLA 12 LRA C300	30,000
	R1	12 (2) A N.O./N.C.	100,000	12 A resistive 5 FLA 30 LRA C300	30,000
	insulation from very low voltage parts			reinforced: 6 mm in air, 8 mm on surface 3750 V insulation	
	insulation between independent relay outputs			basic: 3 mm in air, 4 mm on surface 1250 V insulation	
Connections	screw terminals for cables from 0.5 to 2.5 mm² max current 12 A				
The correct sizing of the power and connection cables between the instrument and the loads is the installer's responsibility. In max. load and max. operating temp. conditions, the cables used must be suitable for operation at least up to 105 °C.					
Case	plastic 34.4 x 76.2 x 79 mm (mounting depth 70,5 mm)				
Assembly	smooth, hard and indeformable panel using side fastening brackets to press in fully				
	drilling template	28.8 ±0.2 x 76.2 ±0.2 mm			
Display	digits	3 digit LED			
	display	from -99 to 999			
	operating status	indicated by graphic icons on the display			
Keypad	4 silicone rubber buttons				
Infrared receiver	available				
Clock with backup battery	available				
Auxiliary alarm relay	available				
Buzzer	available				
Clock	error at 25°C	±10 ppm (±5.3 min/year)			
	error in the temperature range	-50 ppm (-27 min/year)			
	ageing	< ±5 ppm (±2.7 min/year)			
	discharge time	typically 6 months (8 months max)			
	charge time	typically 5 hours (<8 hours max)			
Operating conditions	-10T60 °C, <90% rH non-condensing				
Storage conditions	-20T70 °C, <90% rH non-condensing				
Front panel index of protection	assembly on smooth and indeformable panel with IP65 gasket				
Environmental pollution	2 (normal situation)				
PTI of insulating materials	printed circuits 250, plastic and insulating materials 175				
Period of electrical stress across the insulating parts	long				
Category of resistance to heat and fire	category D and category B (UL 94-V0)				
Class of protection against voltage surges	category 1I				
Type of action/disconnection	1B relay contacts (microswitching)				
Construction of the control device	built-in, electronic				
Classification according to protection against electric shock	Class 2 when appropriately integrated				
Device designed to he hand-held or integrated into equipment designed to be hand-held	no				
Software class and structure	class A				
Cleaning the front panel of the instrument	only use neutral detergents and water				
Serial interface for CAREL network	external				
Repeater display interface	external				
Maximum distance between interface and display	10 m				
Programming key	available				

The IR33 range fitted with the standard CAREL NTC sensor is compliant with standard EN 13485 on thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream. Designation of the instrument: EN13485, air, S, A, 1, -50T90°C. The standard CAREL NTC sensor is identifiable by the printed laser code on "WP" models, or the code "103AT-11" on "HP" models, both visible on the sensor part.

Safety standards: compliant with the relevant European standards.

Installation warnings:

- the connection cables must guarantee insulation up to 90 °C; and, if necessary, up to 105 °C
- adequately secure the connection cables to the outputs so as to avoid contact with very low voltage components.

Manual defrost

As well as automatic defrost, a manual defrost can be activated, if the temperature conditions are right, by pressing "DEF/DOWN" for 5 s.

HACCP functions

ir33 is compliant with the HACCP standards, as it monitors the temperature of the food stored. Alarm "HA"= max. threshold exceeded: up to three HA events are saved (HA, HA1, HA2), from the most recent (HA) to the oldest (HA2), with a signal HAn that displays the number of HA events saved. Alarm "HF"= power failure for more than 1 min. and max. threshold AH exceeded: up to three HF events are saved (HF, HF1, HF2), from the most recent (HF) to the oldest (HF2), with a signal HFn that displays the number of HF events saved. Setting the HA/HF alarm: parameter AH (high temp. threshold); Ad and Htd (Ad + Htd = HACCP alarm delay). Displaying the details: press "SET" to access parameters HA or HF and scroll using "UP/AUX" or "DEF/DOWN". **Deleting the HACCP alarms: press "DEF/DOWN" and "SET" for 5 sec. inside the menu, "res" will be shown to indicate the alarm has been deleted. To delete the saved alarms, press "DEF/DOWN" + "SET" + "UP/AUX" together for 5 seconds**.

Defrost event date and day (parameters td1 to td8)

0 = no event; 1 to 7 = Monday to Sunday; 8 = Monday to Friday; 9 = Monday to Saturday; 10 = Saturday and Sunday; 11 = every day.

Operating parameters

Complete list of parameters for each configuration

frequent parameters 'F' | psw protected parameters 'P' | masked parameters (hidden)

	Cd.	Parameter	Description	Configuration bn1	bn2	bn3	bn4	bn5	bn6
Pro	/2	Measurement stability	1 to 15	4	4	4	4	4	4
	/3	Probe display response	Temperature display refresh speed (0 to 15)	0	0	0	0	0	0
	/4	Virtual probe	Weight % of temp. control probe 2 (0 to 10%)	0	0	0	0	0	0
	/5	Select °C or °F	0: °C, 1: °F	0	0	0	0	0	0
	/6	Decimal point	0: yes (-20 to 20 °C), 1: no	0	0	0	0	0	0
	/tI	Display on internal terminal	Probe reading displayed 1: virtual probe; 2: probe 1; 3: probe 2; 4: probe 3; 5: probe 4; 6: probe 5; 7: set point	2	2	2	2	2	1
	/tE	Display on external terminal	Probe displayed on remote term. 0: no remote term. ; 1: virtual probe; 2: probe 1; 3: probe 2; 4: probe 3; 5: probe 4; 6: probe 5	0	0	0	0	0	0
	/P	Select type of probe	0: NTC-50T90°C; 1: NTC-40T150°C; 2: PTC-50T150°C	0	0	0	0	0	0
	/A2	Probe 2 configuration	0: no probe; 1: product probe; 2: defrost probe; 3: condenser probe; 4: antifreeze probe	0	2	2	2	2	2
	/A3	Probe 3 configuration	As for probe 2 (only if A4=0)	0	0	0	2	2	0
	/A4	Probe 4 configuration	As for probe 2 (only if A5=0)	0	0	0	0	0	0
	/c1	Probe 1 calibration or offset	Corr. to probe 1 reading (-20T20 °C)	0	0	0	0	0	0
	/c2	Probe 2 calibration or offset	Corr. to probe 2 reading (-20T20 °C)	0	0	0	0	0	0
	/c3	Probe 3 calibration or offset	Corr. to probe 3 reading (-20T20 °C)	0	0	0	0	0	0
	/c4	Probe 4 calibration or offset	Corr. to probe 4 reading (-20T20 °C)	0	0	0	0	0	0
ctl	St	Set point	r1Tr2 °C	4	2	-14	2	-14	0
	rd	Control delta	Temp. control diff. or hysteresis (0.1T20 °C)	2	2	2	2	2	2
	rn	Dead zone	0.0T60 °C	4	4	4	4	4	4
	rr	Reverse control differential	+0.1T20 °C	2,0	2,0	2,0	2,0	2,0	2,0
	r1	Minimum set point	Min. value settable for the set point (-50Tr2 °C)	-30	-30	-50	-30	-50	-50
	r2	Maximum set point	Max. value settable for the set point (r1T200 °C)	30	30	30	30	30	60
	r3	Operating mode	0: direct thermostat with defrost control (cool) 1: direct therm. (cool); 2: reverse therm. (heat)	0	0	0	0	0	0
	r4	Automatic set point variation in night-time	Value added to the set point in night-time operation (see A4, A5 and A9) (-20T20 °C)	3,0	3,0	3,0	3,0	3,0	3,0
	r5	Enable temp. monitoring	0: disabled; 1: enabled	0	0	0	0	0	0
	rt	Temp. monitoring interval	temp. recording hours. (0 to 999)	-	-	-	-	-	-
	rH	Maximum temperature read		-	-	-	-	-	-
	rL	Minimum temperature read		-	-	-	-	-	-
cmp	c0	Fan start delay (if relay fitted) on power-up	0 to 15 min	0	0	0	0	0	0
	c1	Minimum time between consecutive starts of compressor	0 to 15 min	0	0	0	0	0	0
	c2	Min. compressor off time	0 to 15 min	0	0	0	0	0	0
	c3	Min. compressor on time	0 to 15 min	0	0	0	0	0	0
	c4	Duty setting or safety relay	Comp. operating time for control probe fault (Fixed off time 15 min) (0 to 100 min)	15	15	15	15	15	0
	cc	Continuous cycle duration	Compressor operating time even when the temp. is below the set point (0 to 15 hours)	0	0	0	0	0	0
	c6	Alarm bypass after continuous cycle	0 to 250 hours	2	2	2	2	2	2
	c7	Max pump down time	0 to 900 s	0	0	0	0	0	0
	c9	Enable autostart with pump down operation	0 = Pump down cycle when closing the valve 1 = Pump down cycle whenever closing the valve and on each following request from low pressure switch (no cooling request)	0	0	0	0	0	0
	c10	Select pump down by time or pressure	0 = End pump down by low press. switch activation; 1 = End when reaching low pressure or after maximum time C7	0	0	0	0	0	0
	c11	Second compressor delay	Second compressor delay, after the first, in start-up (H1=7 or H5=7) (0 to 250 sec)	4	4	4	4	4	4
dEF	d0	Type of defrost	0 = heater by temp. ; 1 = hot gas by temp.; 2 = heater by time; 3 = hot gas by time; 4 = heater by time with temp. control	2	0	0	0	0	0
	dI	Interval between defrosts	0 to 250 hours	8	6	6	6	6	8
	dt1	Evaporator end defrost temp.	-50T200 °C	4	4	4	4	4	4
	dt2	AUX evap. end defrost temp.	-50T200 °C	4	4	4	4	4	4
	dP1	Maximum evaporator defrost duration	1 to 250 min	30	30	30	30	30	30
	dP2	Maximum AUX evaporator defrost duration	1 to 250 min	30	30	30	30	30	30
	d3	Defrost activation delay	Interval between defrost call and effective activation of the relay	0	0	0	0	0	0
	d4	Defrost on start-up	0: disabled; 1: enabled	0	0	0	0	0	0
	d5	Defrost delay on start-up or from multifunction input	0 to 250 min	0	0	0	0	0	0
	d6	Display during defrost	0 = During defrost the display shows "dEF" and the actual temperature, alternating; 1 = During defrost the display shows the last temperature displayed before starting; 2 = During defrost the display shows "dEF" on steady	1	1	1	1	1	1
	dd	Dripping time after defrost	Waiting time before reactivating compressor and fans at the end of a defrost (0 to 15 min)	0	2	2	2	2	2
	d8	Alarm bypass time after defrost and/or door open	See a4, a5 and a9 (0 to 250 hours)	1	1	1	1	1	1
	d8d	Door open alarm delay	See 'a4', 'a5' and 'a9' (0 to 250 hours)	0	0	0	0	0	0
	d9	Defrost priority over compressor protectors	0 = protection times respected at start of defrost; 1 = protection times not respected; the defrost has higher priority	0	0	0	0	0	0
	d/1	Display defrost probe 1		-	-	-	-	-	-
	d/2	Display defrost probe 2	°C/°F	-	-	-	-	-	-
	dC	Time base	0: 'dI' in hours, 'dP1' and 'dP2' in min.1: 'dI' in minutes ,'dP1'and 'dP2' in seconds	0	0	0	0	0	0
	d10	Compressor running time	Compressor operating time with evaporator temp. less than d11, after which a defrost is called (0 to 250 hours)	0	0	0	0	0	0
	d11	Temp. threshold in running time	Evaporation temp. below which the compressor must continue operating for the time d10 to generate a defrost call (-20 to 20 °C)	1	1	1	1	1	1
	d12	Advanced defrost	0 = Skip defrost and automatic variation in "dI" disabled; 1 = Skip defrost disabled, auto variation in "dI" enabled; 2 = Skip defrost enabled, auto variation in dI disabled; 3 = Skip defrost and automatic variation in "dI" enabled	0	0	0	0	0	0
	dn	Nominal defrost duration	1 to 100%	65	65	65	65	65	65
	dH	Prop. factor for variation in "dI"	0 to 100%	50	50	50	50	50	50
ALM	A0	Alarm and fan differential	0.1T20 °C	2,0	2,0	2,0	2,0	2,0	2,0
	A1	Type of threshold AL and AH	0: relative; 1: absolute	1	1	1	1	1	0
	AL	Min. temperature alarm	-50T200 °C	-30	-30	-50	-30	-50	0
	AH	Max. temperature alarm	-50T200 °C	+30	+30	+30	+30	+30	0
	Ad	Temperature alarm delay	0 to 250 min	30	30	30	30	30	120
	A4	Digital 1 input configuration	0 = input not active; 1 = Immediate ext. alarm; 2 = delayed external alarm (time A7); 3 = Enable defrost; 4 = Start defrost from ext. contact; 5 = Door switch with comp. and fans OFF; 6 = remote ON/OFF; 7 = Curtain switch; 8 = Low press. switch input for pump down; 9 = Door switch with fans OFF; 10 = Direct / reverse operation; 11 = Light sensor; 12 = AUX output activation; 13 = Door switch with comp. and fans OFF (light not managed); 14 = Door switch with fans OFF (light not managed)	0	5	5	0	0	0
	A5	Digital 2 input configuration	as for A4	0	0	0	0	0	0
	A6	Stop compressor from external alarm	Forced compressor operating time for external alarms (0 to 100 min)	0	0	0	0	0	0
	A7	External alarm delay	If A4= 2, A5= 2 or A9= 2 (0 to 250 min)	0	0	0	0	0	0
	A8	Enable alarms Ed1 and Ed2	0 = signal "Ed1" and "Ed2" on display (end defrost due to maximum duration dP1/dP2) disabled1 = Sign. "Ed1" and "Ed2" enabled	0	0	0	0	0	0
ALM	Ac	High condenser temp. alarm	0T200 °C	70	70	70	70	70	70
	AE	High condenser temperature alarm differential	Differential or hysteresis for activation/deactivation of high cond. temp. pre-alarm (0.1T20 °C)	10	10	10	10	10	10
	Acd	High condenser temp. alarm delay.	0 to 250 min	0	0	0	0	0	0
	AF	Off time with light sensor	Light sensor management 0 = sensor in the door jamb (the inside light is switched on when the sensor detects light and off when it detects darkness > 0 = sensor inside cold room or cabinet; the inside light is switched on when the sensor detects light. After the time AF in seconds the light is switched off for 3 sec to see if the door has been closed. In the event of darkness the inside light remains off, the inside light it is switched on again after a minimum time of 3 sec and the cycle restarts (0 to 250)	0	0	0	0	0	0
	ALF	Antifreeze alarm threshold	Active if /A2, /A3, /A4 or /A5= 4 (-50T200 °C)	-5	-5	-5	-5	-5	-5
	AdF	Antifreeze alarm delay	0 to 15 min	1	1	1	1	1	1
FAn	F0	Fan management	0 = Fans always on 1 = Fans on based on difference between control probe and evaporator temp. 2 = Fans on based on evaporator temp.	0	0	0	0	0	0
	F1	Fan start temperature	F0 = 1 - F1 indicates the min. difference between room and evap. temp. to activate the fans F0 = 2 - F1 indicates the absolute fan activation temp. -50T200 °C	5	5	5	5	5	5
	F2	Fan off with compressor off	0 = Fans always active (F0=0) or upon request (F0=1,2) even when comp. off 1 = Fans off when compressor off	1	1	1	1	1	1
	F3	Fan in defrost	0 = Fans active during defrost 1 = Fans not active during defrost	0	0	1	0	1	1
	Fd	Fans off after dripping	Fan off time after defrost and after dd (0 to 15 min)	0	2	2	2	2	1
	F4	Condenser fan stop temperature	-50T200 °C	40	40	40	40	40	40
	F5	Condenser fan start differential	Differential or hysteresis used for condenser fan control (0.1T20 °C)	5	5	5	5	5	5

CmF AUX	H0	Serial address	0 to 207	1	1	1	1	1	1
	H1	Function of AUX output	0 = Norm. energised alarm output; 1 = Norm. de-energised alarm output; 2 = Auxiliary output. Activate/deactivates output by AUX button on keypad; 3 = Light output; 4 = Auxiliary evap. defrost output; 5 = Pump down valve output; 6 = Condenser fan output; 7 = Delayed compressor output; 8 = Auxiliary output with deactivation in OFF; 9 = Light output with deactivation in OFF; 10 = No function associated with the output; 11 = Reverse output in control with dead band; 12 = Second comp. step output; 13 = Second comp. step output with rotation	1	3	3	4	4	1
	H2	Lock keypad and/or remote control	0 = Set type F par. and set point disabled; 2 = Set type F parameters, settings from remote and set point disabled; 3 = Settings from remote disabled; 4 = Cont. cycle, defrost, set type F par. and ON/OFF disabled; 5 = Continuous cycle, defrost, set type F parameters, set point and ON/OFF disabled; 6 = Continuous cycle, defrost, set type F par. and set point disabled	1	1	1	1	1	1
	H3	Remote control enable code	0 to 255	0	0	0	0	0	0
	H4	Terminal buzzer	0: enabled; 1: disabled	0	0	0	0	0	0
	H6	Lock terminal keypad	1 (0) = enable/disable print report; 2 (1) = enable/disable defrost; 4 (2) = enable/disable continuous cycle; 8 (3) = enable/disable mute; 16 (4) = enable/disable HACCP access; 32 (5) = enable/disable AUX output; 64 (6) = enable/disable ON/OFF	0	0	0	0	0	0
	H8	Select output activated by time band	0: time band linked to light output 1: time band linked to AUX (see 'H1' or 'H5')	0	0	0	0	0	0
	H9	Enable set point variation with time bands	0: set point variation with time band disabled 1: set point variation with time band enabled	0	0	0	0	0	0
	Hdh	Anti-sweat heater offset	AUX output configured as light or AUX ('H1'= 2, 3, 8 or 9) remains off until the control temp. is less than 'St'+'Hd' when first switching on or when resetting alarms. (-0T200 °C)	0	0	0	0	0	0
HcP HACCP	HAn	Number of HA alarm events	High temperature alarm (HA). The maximum number of events counted is 15 (0 to 15)	0	0	0	0	0	0
	HA	Date/time of the last HA alarm	This parameter accesses the submenu to display the day, month, year, hours, minutes and duration of the last alarm HA activated.	-	-	-	-	-	-
	y_	Year	0 to 99	0	0	0	0	0	0
	M_	Month	1 to 12	0	0	0	0	0	0
	d_	Day	1 to 7	0	0	0	0	0	0
	h_	Hours	0 to 23	0	0	0	0	0	0
	m_	Minutes	0 to 59	0	0	0	0	0	0
	t_	Duration	0 to 99 hours	0	0	0	0	0	0
	HA1	Date/time of second-to-last HA alarm	This parameter accesses the submenu to display the day, month, year, hours, minutes and duration of the second-to-last HA alarm activated.	-	-	-	-	-	-
	HA2	Date/time of third-to-last HA alarm	This parameter accesses the submenu to display the day, month, year, hours, minutes and duration of the third-to-last HA alarm activated.	-	-	-	-	-	-
	HFn	Number of HF alarm events	High temp. alarm for blackout (HF). The maximum number of events counted is 15 (0 to 15)	0	0	0	0	0	0
	HF	Date/time of the last HF alarm	This parameter accesses the submenu to display the day, month, year, hours, minutes and duration of the last HF alarm activated.	-	-	-	-	-	-
	y_	Year	0 to 99	0	0	0	0	0	0
	M_	Month	1 to 12	0	0	0	0	0	0
	d_	Day	1 to 7	0	0	0	0	0	0
	h_	Hours	0 to 23	0	0	0	0	0	0
	m_	Minutes	0 to 59	0	0	0	0	0	0
	t_	Duration	0 to 99 hours	0	0	0	0	0	0
	HF1	Date/time of the second-to-last HA alarm	This parameter accesses the submenu to display the day, month, year, hours, minutes and duration of the second-to-last HA alarm activated.	-	-	-	-	-	-
	HF2	Date/time of the third-to-last HA alarm	This parameter accesses the submenu to display the day, month, year, hours, minutes and duration of the third-to-last HA alarm activated.	-	-	-	-	-	-
	Htd	HACCP alarm delay	Time delay for activation of HA and HF alarm	0	0	0	0	0	0
rtc	td1	Defrost time band 1	Defrost setting with RTC for the first time band.When the display shows parameters td1 to td8, press SET to set the day, hours and minutes of the defrost for the selected time band	-	-	-	-	-	-
	d_	Day	0 = Event disabled; 1,....7 = Monday,...,Sunday; 8 = Monday to Friday; 9 = Monday to Saturday; 10 = Saturday & Sunday; 11 = Every day	0	0	0	0	0	0
	h_	Hours	0 to 23	0	0	0	0	0	0
	m_	Minutes	0 to 59	0	0	0	0	0	0
	td2.. td8	Defrost time band 2 to 8	Defrost setting with RTC for the second to eighth time bands	-	-	-	-	-	-
	ton	Time band to switch light/AUX on	Setting to switch light or AUX on with RTC (see par. H8) When the display shows parameter ton, press SET to set the ON day, hours and minutes	-	-	-	-	-	-
	d_	Day	0 = Event disabled; 1,....7 = Monday,...,Sunday; 8 = Monday to Friday	0	0	0	0	0	0
	h_	Hours	0 to 23	0	0	0	0	0	0
	m_	Minutes	0 to 59	0	0	0	0	0	0
	toF	Time band to switch light/AUX off	Setting to switch light or AUX off with RTC (see par. H8) When the display shows parameter tof, press SET to set the OFF day, hours and minutes	-	-	-	-	-	-
	d_	Day	0 = Event disabled; 1,....7 = Monday,...,Sunday; 8 = Monday to Friday	0	0	0	0	0	0
	h_	Hours	0 to 23	0	0	0	0	0	0
	m_	Minutes	0 to 59	0	0	0	0	0	0
	tc	RTC date/time setting	When the display shows parameter tc, press SET to set the date and time of the RTC clock	-	-	-	-	-	-
	y_	Year	0 to 99	0	0	0	0	0	0
	M_	Month	1 to 12	1	1	1	1	1	1
	d_	Day of the month	1 to 31	1	1	1	1	1	1
	u_	Day of the week	1 to 7	6	6	6	6	6	6
	h_	Hours	0 to 23	0	0	0	0	0	0
	m_	Minutes	0 to 59	0	0	0	0	0	0

IMPORTANT WARNING: for the set times to become immediately operational, the instrument needs to be turned off and on again. If this operation is not carried out, timing resumes operation the next time it is used, when the internal timers are reset.

Alarms and signals: display, buzzer and relay

Below is a table that describes the alarms and control signals, with the corresponding description, status of the buzzer, alarm relay and type of reset.

Code	Description	Icon flashing	Alarm relay	Buzzer	Reset
rE	Virtual control probe fault	✎	ON	ON	AUTO
E0	Room probe S1 fault	✎	OFF	OFF	AUTO
E1	Defrost probe S2 fault	✎	OFF	OFF	AUTO
E2-3	Probe S3-4 fault	✎	OFF	OFF	AUTO
" "	Probe not enabled	-	OFF	OFF	AUTO
LO	low temperature alarm	▲	ON	ON	AUTO
HI	high temperature alarm	▲	ON	ON	AUTO
AFr	antifreeze alarm	▲	ON	ON	MAN
IA	immediate alarm from external contact	▲	ON	ON	AUTO
dA	delayed alarm from external contact	▲	ON	ON	AUTO
dEF	defrost running	❄ always on	OFF	OFF	AUTO
Ed1	defrost on evaporator 1 ended by timeout	-	OFF	OFF	AUTO
Ed2	defrost on evaporator 2 ended by timeout	-	OFF	OFF	AUTO
Pd	maximum pump down time alarm	✎	ON	ON	AUTO/MAN
LP	low pressure alarm	✎	ON	ON	AUTO/MAN
AtS	autostart in pump down	✎	ON	ON	AUTO/MAN
cht	high condenser temperature pre-alarm	-	OFF	OFF	AUTO/MAN
CHT	high condenser temperature alarm	▲	ON	ON	MAN
dor	door open for too long alarm	▲	ON	ON	AUTO
Etc	real time clock fault	🕒	OFF	OFF	AUTO
EE	Unit parameter EEPROM error	✎	OFF	OFF	AUTO
EF	Operating parameter EEPROM error	✎	OFF	OFF	AUTO
HA	HACCP alarm type HA	HACCP	OFF	OFF	AUTO
HF	HACCP alarm type HF	HACCP	OFF	OFF	AUTO
rCt	Connection with IR remote control active	-	-	-	-
Add	Auto. address assignment procedure in progress	-	-	-	-
Prt	Report printing in progress	-	-	-	-
LrH	Low relative humidity procedure activation	-	-	-	-
HrH	High relative humidity procedure activation	-	-	-	-
ccb	Start continuous cycle call				
ccE	End continuous cycle call	-	-	-	-
dFb	Start defrost call	-	-	-	-
dFE	End defrost call	-	-	-	-
On	Switched ON	-	-	-	-
OFF	Switched OFF	-	-	-	-
rES	Reset alarms with MAN reset, reset temp. monitor.	-	-	-	-
n1-n6	Alarm on unit 1-6 in the network	▲	ON	ON	AUTO
dnL	Download procedure in progress	-			-
d1-d6	Download procedure with errors on unit 1-6	▲	OFF	OFF	-

Note: the buzzer is activated if enabled by parameter 'H4'. The alarm relay is activated if auxiliary output 1 (H1) has been assigned to the alarm relay function (normally closed or open). It can be disabled from the CAREL supervisory system.

Reset alarms with manual reset

All the alarms with man. reset can be reset by pressing "PRG/mute" and "UP/AUX" for more than 5 s.

Disposal of the product

The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal

IMPORTANT WARNINGS:The CAREL product is a state-of-the-art device, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com. The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. The failure to complete such phase, which is required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases. The customer must use the product only in the manner described in the documentation relating to the product.The liability of CAREL in relation to its products is specified in the CAREL general contract conditions, available on the website www.carel.com and/or by specific agreements with customers.

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