

HUSSMANN®

CoreLink™

Full Trans-critical Efficiency Application



Full Trans -critical Efficiency (FTE)
Application Version – 3.8/4.0

IMPORTANT

Keep in factory for
future reference!

Introduction and Requirements

Purpose of this manual is to provide field service personnel the information necessary for FTE Application

Full Trans-critical Efficiency (FTE)

The Full Trans-critical Efficiency(FTE) AKA Liquid Flood back enabled system employs a low-pressure liquid receiver to flood medium temperature evaporators with liquid CO2. This eliminates superheat and allows the evaporation temperature in the cabinets – and ultimately the efficiency of the system – to increase.

From the case controller standpoint, this is what happens:

- The case is started in normal refrigeration mode, and will maintain a target discharge air temperature and superheat setpoint
- The system will be put into FTE mode during the startup and commissioning period, which changes the controller to manage discharge air, allowing the coil to fill. The valve will modulate only once discharge air is below setpoint
- Once stabilized, the refrigeration system controller will increase the evaporator temperature by altering system parameters and monitoring the return tank

Software Requirements

- Following versions or higher versions of software packages are configured within the CoreLink and are required to support FTE functionality
 - CoreLink
 - Application Version 3.8 or higher

Bios Version: 2020052000

Web UI Version: 2.5.0

Application Version: 3.8.0

Application Date Code: 11122

- E2 Description file should be **version 9** or higher to use FTE feature

Overview

- FTE can be Enabled/Disabled in CoreLink in different ways as below
 1. Enable/Disable FTE through Command menu of CoreLink
 2. Enable/Disable FTE through CoreLink digital input
 3. Enable/Disable FTE through system manager network command

Notes:- By default FTE is disabled in CoreLink and Digital input is not configured. Field configuration is required if enabling FTE through Digital Input.

- FTE is enabled in CoreLink during the Refrigeration mode.
- If FTE mode is enabled during defrost CoreLink completes the defrost cycle and then goes to FTE mode.
- During FTE mode, the low superheat shutdown threshold values are automatically changed to -40 degrees and the Minimum Superheat alarm changed to -45 degrees

Superheat Alarm ⓘ

Min SH Alarm 1:	-45.0	(-25 to 30.0) °F
Min SH Alarm 2:	-45.0	(-25 to 30.0) °F
Min SH Alarm 3:	-45.0	(-25 to 30.0) °F

Low Superheat Safeties

Low SH shutdown 1:	-40.0	(0 to 30) °F
Low SH shutdown 2:	-40.0	(0 to 30) °F
Low SH shutdown 3:	-40.0	(0 to 30) °F

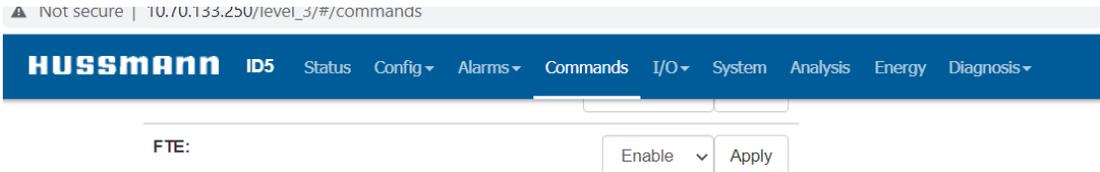
- When FTE mode is disabled, the low superheat shutdown threshold values are automatically changed back to previous configuration values
- In the Analysis page, the Control Status logs FTE when its enabled
- If there is communication lost from System manager, CoreLink will maintain the same mode as previously configured.
- When multiple FTE modes are enabled (System manager, Digital input) then CoreLink will enable FTE mode with any one or both initiatives.

CoreLink Status	System manager	Corelink DI
REFR	Off	Off
FTE	On	Off
FTE	Off	On
FTE	On	On

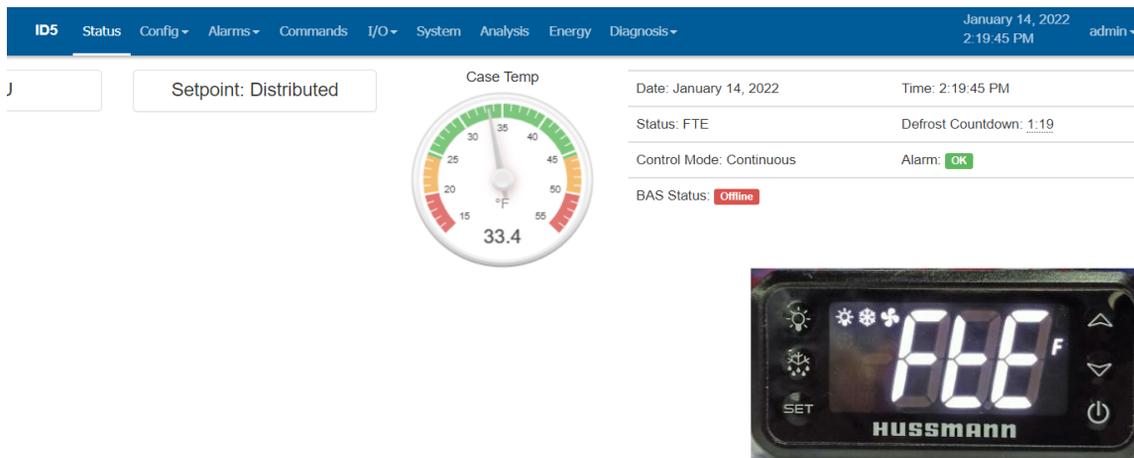
Enabling FTE through CoreLink Command Menu

1. Enabling FTE mode with the CoreLink Command

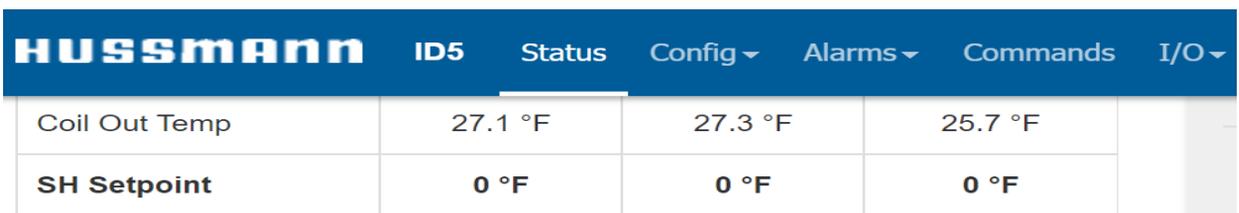
- FTE can be enabled in CoreLink via command menu with the CoreLink UI



- When FTE is enabled, the status of the CoreLink changes to FTE which can be viewed on the UI status page and on the remote display also.



- After enabling FTE mode, the Superheat set point is changed to 0 which can be shown on the status page



The screenshot shows the CoreLink status page with a table of temperatures. The navigation bar is the same as in the previous images. The table has four columns and two rows:

	27.1 °F	27.3 °F	25.7 °F
Coil Out Temp	27.1 °F	27.3 °F	25.7 °F
SH Setpoint	0 °F	0 °F	0 °F

- When in FTE mode, the refrigeration PID is adjusted in controller to open the valve when discharge air raises above setpoint

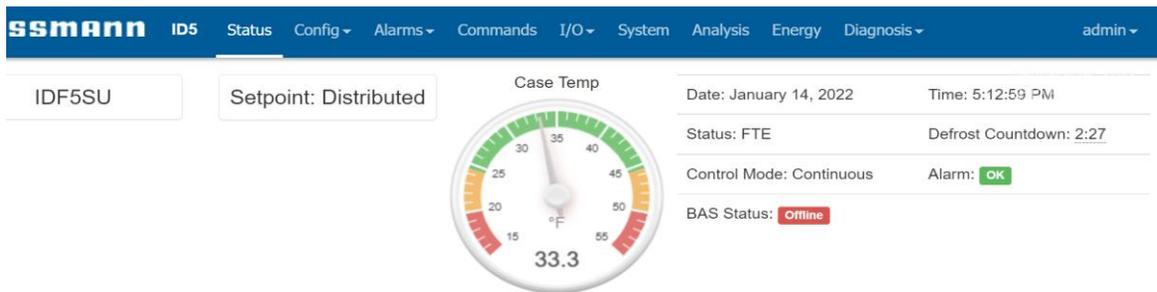
Enabling FTE through CoreLink Digital Input

1. Enabling FTE mode through the CoreLink Digital Input

- FTE can be enabled in CoreLink via Digital Input, below is the configuration, FTE can be configured to any spare Digital input by default it is configured as below

DIC08 (Pin 27):	Drain Sensor	▼	DIP08 (Pin 27):	Close	▼
DIC09 (Pin 28):	FTE	▼	DIP09 (Pin 28):	Close	▼

- When FTE is enabled on a digital input and input is triggered, the status of the CoreLink changes to FTE which can be viewed on the Web UI status page



- After enabling FTE mode, the Superheat set point changes to 0 which can be seen on the status page

The screenshot shows the HUSSMANN ID5 Web UI status page. The navigation bar includes 'HUSSMANN ID5', 'Status', 'Config', 'Alarms', 'Commands', 'I/O', 'System', 'Analysis', and 'Energy'. Below the navigation bar is a table with three columns of data:

Valve Position	85 %	85 %	85 %
Coil Out Temp	27.1 °F	27.3 °F	25.7 °F
SH Setpoint	0 °F	0 °F	0 °F

To the right of the table, there are labels for 'Evap Fan:' and 'Cond Fan:'.

- When controller is running in FTE mode refrigeration PID is adjusted in controller to open the valve when discharge air raises above setpoint

Disabling FTE through CoreLink Command Menu

1. Disabling FTE mode with the CoreLink Command

- FTE can be disabled in CoreLink via command menu with the CoreLink UI



FTE:

Disable ▾

- When FTE is disabled, the status of the CoreLink reverts to REFR which can be viewed on the UI status page

Date: January 18, 2022	Time: 5:52:02 PM
Status: REFR	Defrost Countdown: 1:49
Control Mode: Continuous	Alarm: OK
BAS Status: Offline	

- After disabling FTE mode, the Superheat set point reverts to previous SH setpoint which can be shown on the status page

Cool Out Temp	41.1 °F	41.3 °F	40.1 °F
SH Setpoint	5 °F	5 °F	5 °F

Disabling FTE through CoreLink Digital Input

1. FTE can be disabled in CoreLink via Digital input

- FTE can be disabled in CoreLink by removing the 24V signal to the Digital Input
- When FTE is disabled, the status of the CoreLink reverts to REFR which can be viewed on the UI status page

Date: January 18, 2022

Time: 5:52:02 PM

Status: REFR

Defrost Countdown: 1:49

Control Mode: Continuous

Alarm: **OK**

BAS Status: **Offline**

- After disabling FTE mode, the Superheat set point reverts to previous SH setpoint which can be shown on the status page

Cool Out temp	21.1 F	21.3 F	20.1 F
SH Setpoint	5 °F	5 °F	5 °F

Enabling FTE in CoreLink through E2

- FTE can be enabled in CoreLink via E2 network command within the Inputs-net tab

Property:	Value:
AMBLIGHTNETWORK	0
DEFROSTINIT_NET	NA
DEFRTERM_NET	NA
ENDWAITCMD	NA
DEWPOINTNETWORK	0
DUALTEMPNETWORK	OFF
ENABLENETWORK	ON
PRESSURENETWORK	0
REFRIGDISABLNET	OFF
LIGHTCONTROLNET	ON
FTE/SH OPT	ON

- When FTE is enabled, the status of the CoreLink changes to FTE which can be viewed on the E2 status page

Controller Name		System Status		ADVISORY SUMMARY	
V3.8 ID5sw		Def Countdown	205.00 min	App Version	3.8.0
CASE STATUS		CTRL Status	FTE	Dash Hum	3277 %Rh
Control Temp	33.80 'F	Refrig Type	C02	Dash Temp	3277 'F
Saturation Temp	NONE 'F	CTRL Mode	Continuous	CT Ref Rd	327.6 A
Number of Valves	3	INPUTS/OUTPUTS			
Phase Loss	NOT	Refrig 1	NOT Defrost	NOT	
Dual Temp DI	NOT	Refrig 2	NOT Light	NOT	Door Sw
Dual Temp Network	OFF	Refrig 3	NOT Alarm	NOT	Clean Sw
Case Type	Rem Std	Evap Fan	NOT Drain S.	NOT	Drain Alrm
		Cond Fan	ON	Curtain	OPEN
ZONE 1		ZONE 2		ZONE 3	
SUPERHEAT	74.80	SUPERHEAT	74.80	SUPERHEAT	74.80

- After enabling FTE mode active set point of Superheat is changed to 0 which can be shown on the E2 status page

Controller Name		System Status		ADVISORY SUMMARY	
V3.8 ID5sw		Def Countdown	205.00 min	App Version	3.8.0
CASE STATUS		CTRL Status	FTE	Dash Hum	3277 %Rh
Control Temp	33.80 'F	Refrig Type	C02	Dash Temp	3277 'F
Saturation Temp	-36.2 'F	CTRL Mode	Continuous	CT Ref Rd	327.6 A
Number of Valves	3	INPUTS/OUTPUTS			
Phase Loss	OFF	Refrig 1	ON Defrost	OFF	
Dual Temp DI	OFF	Refrig 2	ON Light	ON	Door Sw
Dual Temp Network	OFF	Refrig 3	ON Alarm	OFF	Clean Sw
Case Type	Rem Std	Evap Fan	ON Drain S.	OFF	Drain Alrm
		Cond Fan	ON	Curtain	OPEN
ZONE 1		ZONE 2		ZONE 3	
SUPERHEAT	74.80	SUPERHEAT	74.80	SUPERHEAT	74.80
SH Setpoint	5.00	SH Setpoint	5.00	SH Setpoint	5.00
Active SH-1	0	Active SH-2	0	Active SH-3	0

- Active SH-1/2/3 is only applicable to FTE mode and is not considered in any other control applications.

Note – E2 Description file **version 9** or higher supports FTE feature

Disabling FTE in CoreLink through E2

- FTE can be disabled in CoreLink via E2 network command within the Inputs-net tab

Property:	Value:
AMBLIGHTNETWORK	0
DEFROSTINIT_NET	NA
DEFRTERM_NET	NA
ENDWAITCMD	NA
DEWPOINTNETWORK	0
DUALTEMPNETWORK	OFF
ENABLENETWORK	ON
PRESSURENETWORK	0
REFRIGDISABLNET	OFF
LIGHTCONTROLNET	ON
FTE/SH OPT	OFF

- When FTE is disabled, the status of the CoreLink reverts to REFR and the Active SH setpoints revert to configured Super Heat setpoints.

The screenshot displays the CoreLink control interface. At the top, it shows 'CoreLink' with 'NAMES FULL' and a red '*ALARM*' indicator. The main display is divided into several sections:

- Controller Name:** V3.8 ID5sw
- System Status:** Def Countdwn 195.00 min, App Version 3.8.0, CTRL Status REFR, Refrig Type CU2, CTRL Mode Continuous, Dash Hum 3277 %Rh, Dash Temp 3277 'F, CT Ref Rd 327.6 A.
- Case Status:** Control Temp 33.80 'F, Saturation Temp -36.2 'F, Number of Valves 3, Phase Loss OFF, Dual Temp DI OFF, Dual Temp Network OFF, Case Type Rem Std.
- Inputs/Outputs:** Refrig 1 ON Defrost OFF, Refrig 2 ON Light ON Door Sw OFF, Refrig 3 ON Alarm OFF Clean Sw OFF, Evap Fan ON Drain S. OFF Drain Alrm OFF, Cond Fan ON Curtain OPEN.
- Zone Settings (Zones 1, 2, and 3):** Each zone shows SUPERHEAT 74.80, SH Setpoint 5.00, and Active SH-1, Active SH-2, and Active SH-3 all set to 5.00.
- Advisory Summary:** Shows 1 Fail, 1 Alarm, and 7 Notices.
- Network Overview:** MODBUS-1 is active.
- Unit Information:** E2 Unit01, Rev 4.09F04, English-US.

At the bottom, there are navigation buttons: 'Press enter for a list of actions.', 'F3: CIRCUITS', and 'F5: SETUP'.