



Quick Start Guide

Liquid Nitrogen Dosing System

Pack Premier Controller



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Revision Log

Revision Level	Date	Description
A	10/02/2017	Original
B	5/24/2019	Updated HMI Screens
C	2/17/2025	Address Update



Preface

General

The Pack Premier Controller provides ExacTrack™ Superior Dosing Accuracy operation, Dynamic Dose operation, Continuous Dose, Liquid Level Control and Automatic Purge. Operations are setup in recipes where the user will set dose mode, dose duration, liquid level and purge set points.

Product Highlights

- ExacTrack dosing monitors the line speed and container timing to provide a precise discrete dose at any line speed (and while ramping up or down) up to 25k CPM with an EDS actuator.
- Dynamic Dose is the process of sequential container dosing allowing separate delay and duration set points for each dose drop.
- Continuous Dose is activated when the line speed exceeds the system designed limit or recipe setpoint. When active the system provides a continuous liquid stream from the dosing nozzle when containers are present.
- Liquid Level Control allows the user to control how much liquid nitrogen is stored in the CryoDoser Flex™ LN₂ Dosing System unit providing a high or low pressure dose. Liquid Level Control consists of a high set point and low set point set by the user.
- Auto Purge is initiated from a preset time and date in a recipe or from manual activation. When the purge is enabled, gas will flow into the dosing head removing any liquid nitrogen, water or ice buildup in the system.
- Recipes are the backbone of the control system, each process is stored in a recipe. A recipe is created in the Recipe Manager, an unlimited number of recipes can be stored on the system. Recipes manage the dose type, dose duration, continuous set point, liquid level and purge date, time and duration.

Quick Start Guide

This manual contains information regarding the setup and usage of the Pack Premier Controller. If at any time you have questions about setup or operation, please contact customer service at 1-800-371-3303.

Terms

Throughout this manual safety precautions will be designated as follows:



Warning! *Description of a condition that can result in personal injury or death.*



Note: *A statement that contains information that is important enough to emphasize or repeat.*

Acronyms / Abbreviations

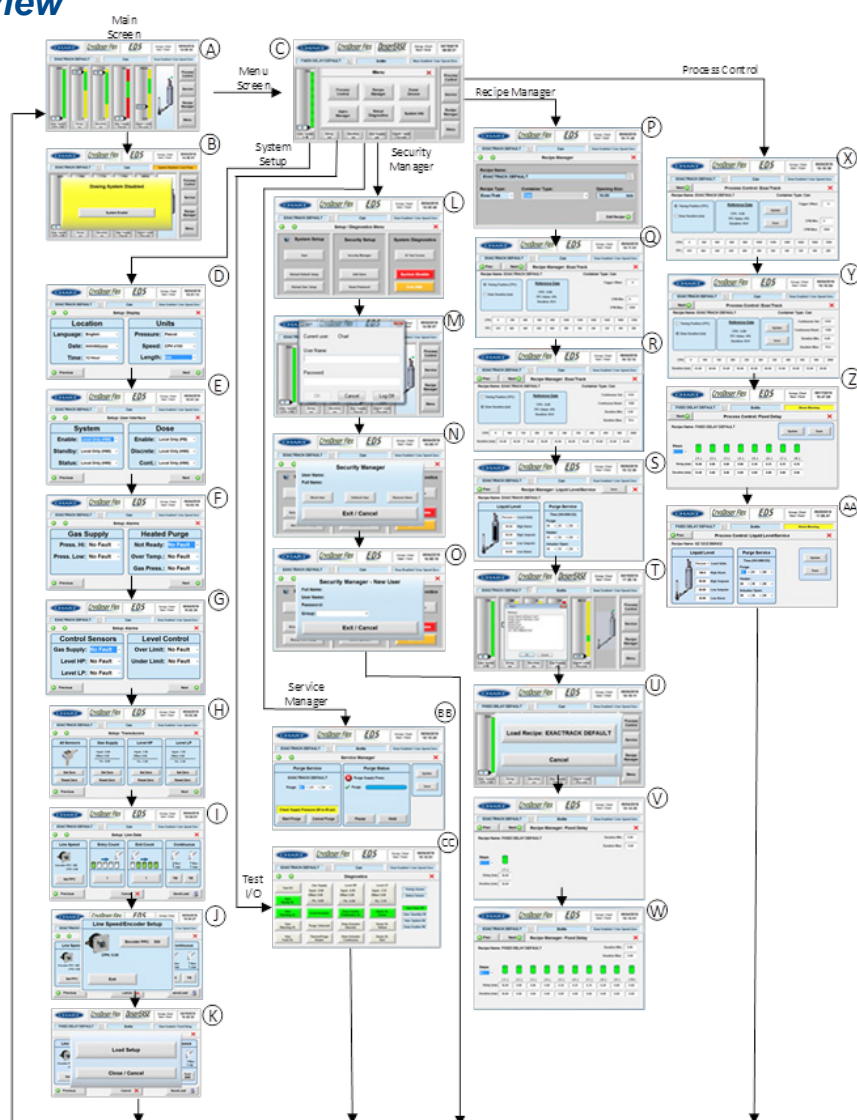
The following acronyms / abbreviations are used throughout this manual:

CPM	Containers Per Minute
EDS	Electronic Dosing System
PPC	Pulses Per Container
TPC	Timing Pulses/Container



Quick Start Procedure

Screen Overview

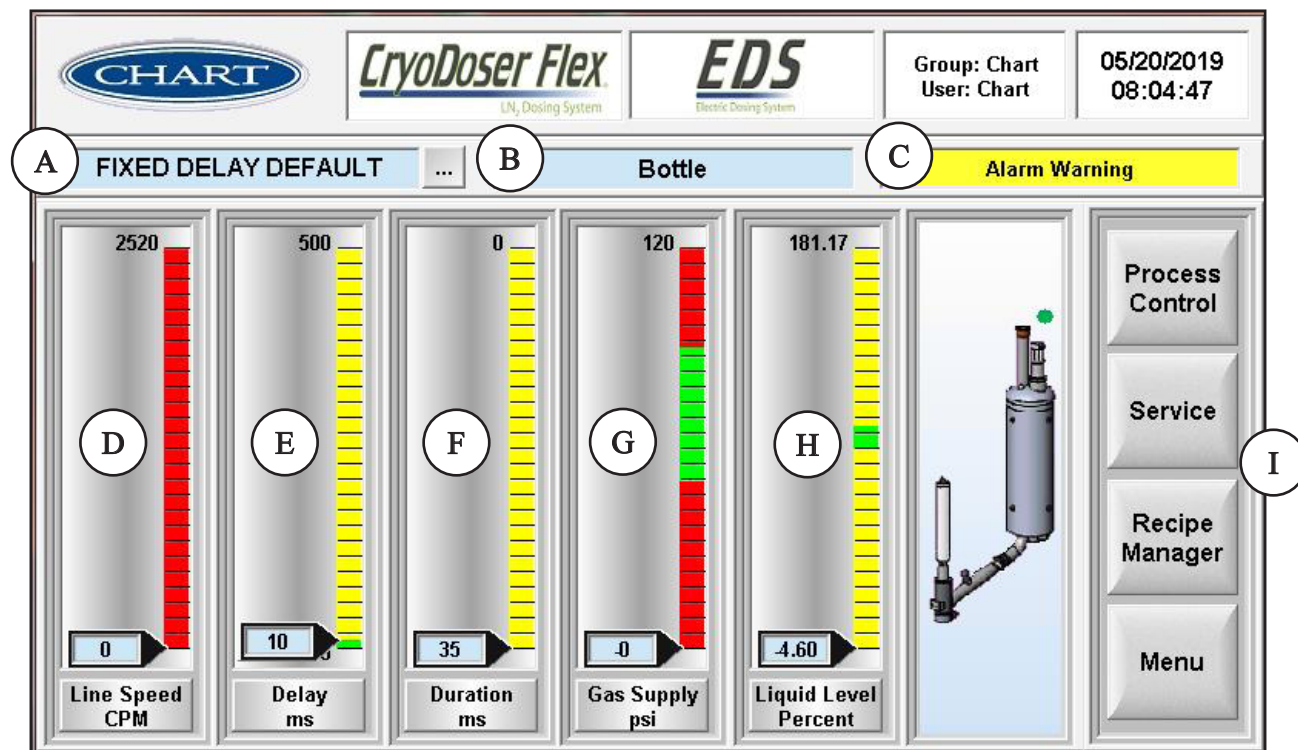


Item	Description
A	Main Screen
B	Enable/Disable Screen
C	Menu Screen
D	Setup Screen 1 - Display Settings
E	Setup Screen 2 - User Interface
F	Setup Screen 3 - Alarms 1
G	Setup Screen 4 - Alarms 2
H	Setup Screen 5 - Transducers
I	Setup Screen 6 - Line Data
J	Setup Screen 7 - Encoder
K	Setup Screen 8 - Load Setup
L	Security Setup Screen
M	Security Setup Screen 2
N	Security Manager Screen pg. 1
O	Security Manager Screen pg. 2

Item	Description
P	Recipe Manager Main Screen
Q	Recipe Manager ExacTrack Screen pg. 1
R	Recipe Manager ExacTrack Screen pg. 2
S	Recipe Manager Liquid Level Screen
T	Recipe Manager Show Recipe Screen
U	Recipe Manager Load Recipe Screen
V	Recipe Manager Fixed Delay Screen pg. 1
W	Recipe Manager Fixed Delay Screen pg. 2
X	Process Control ExacTrack Screen pg. 1
Y	Process Control ExacTrack Screen pg. 2
Z	Process Control Fixed Delay Screen pg. 2
AA	Process Control
BB	Service Manager Screen - Purging
CC	Diagnostic - Test I/O Screen

Main Page

The Main Page provides access to view other screens, load recipes and monitor operation performance.



Item	Description
A	Recipe Display/Select/Load
B	Line/Controller Status
C	Operation Status
D	Line Speed
E	Dose Delay

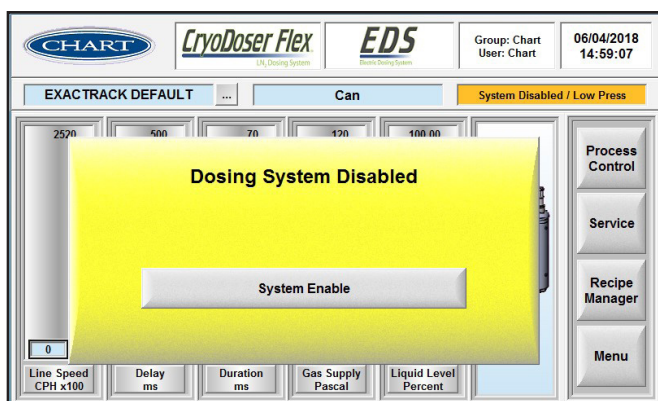
Item	Description
F	Dose Duration
G	Nitrogen Gas Supply
H	Liquid Nitrogen Level
I	Screen Select Buttons

System Enable

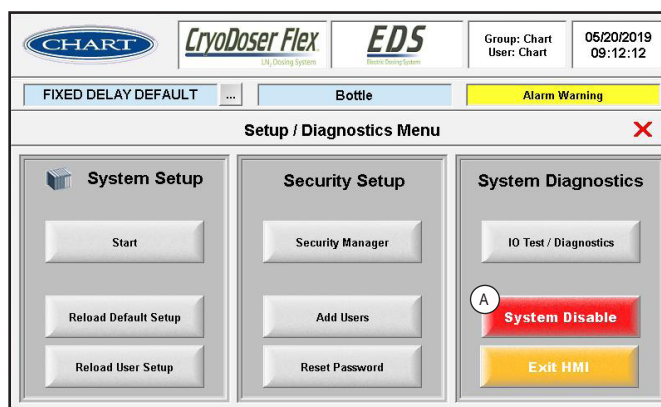


Note: Do not turn on liquid nitrogen supply or nitrogen gas supply until setup is complete.

When the system power is turned on, the control system will be in the disabled mode. When in the disabled mode the dose functions and liquid level control will not operate. Operators should always disable the system during maintenance operations.



Enable the control system by pressing the “System Enable” button (A).

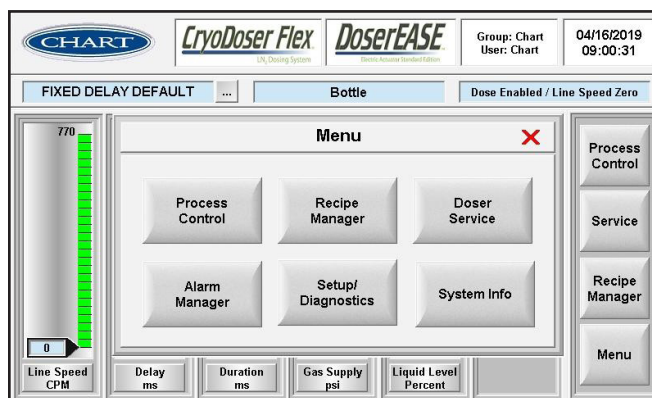


To disable the control system go to the Setup Menu and select the “System Disable” button (A). The Dosing System Disabled button will appear.

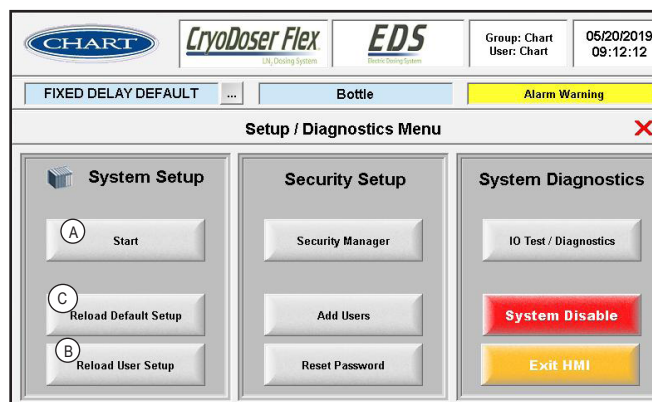
System Setup



Note: Turn off nitrogen gas supply, liquid nitrogen supply and empty the liquid nitrogen chamber before performing setup procedure.



From the menu, select the “Setup/Diagnostics” button (A).



To create a new setup select the “Start” button (A).

To reload a saved setup select the “Reload User Setup” button (B).

To load the default setup select the “Reload Default Setup” button (C).

Setup User Interface

Set the “Display” options for the language and units that will be displayed on all screens. Press the “Next” button (A).

Set the “User Interface” options for the System and Dose.

- Local Only - Operation is controlled from the doser controller only, no remote operation
- User Input - Operation is controlled from the doser controller or from remote dry contacts
- Ethernet - Custom operation, please consult factory

Press the “Next” button (A).

Set the “Sensor Interface” type.

- Detect — Typically a photo-electric or similar sensor, this device checks to see if containers are on the filling line.
- Timing — Typically an inductive proximity sensor capable of sensing metal. This device is placed on a location that is one-to-one with each container and is very accurate.
- Speed — Either a sensor as with the timing device or an encoder device that is placed on the filling line in a location that can read the speed of the line.

Set the “Doser Options”

- Dose Actuator: EASE - General purpose actuator, EDS - High speed actuator, EP Head - high speed - pneumatic
- Level Actuator: Bimba - Pneumatic actuator
- Purge Type - Standard purge installed on all systems, ThermoPurge optional

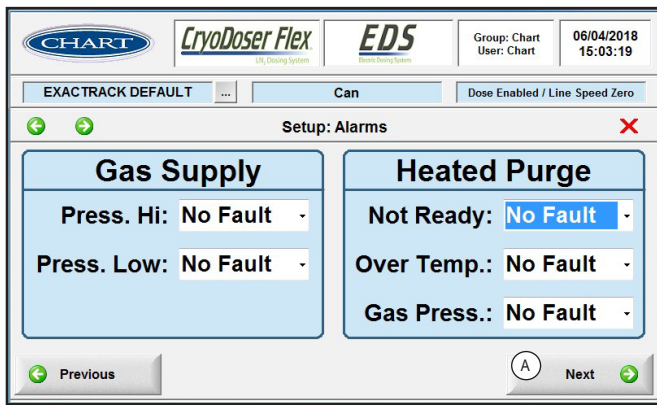
Press the “Next” button (A).

Setup Alarms

Alarms have 3 settings which are set from the pull-down boxes.

- No Fault (Green Ind.) - Dosing is not interrupted and can be initiated without clearing the alarm.
- Warning (Yellow Ind.) - Dosing is not interrupted however dosing cannot be initiated without clearing the alarm.
- Fault (Red Ind.) - Dosing is suspended and cannot be initiated without clearing the alarm.

Set the Line Sensors and Control Sensors then press the “Next” button (A)

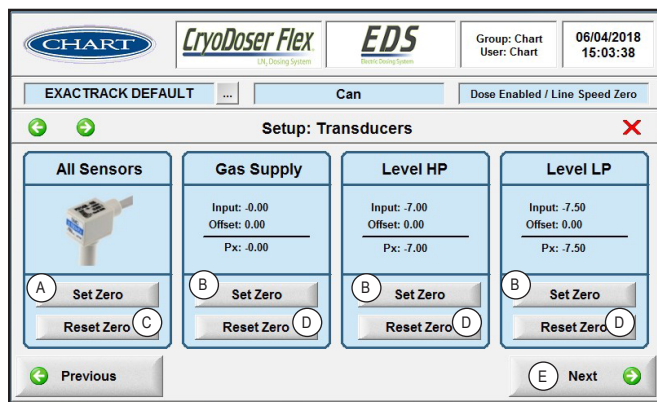


Set the Gas Supply and Heated Purge then press the “Next” button (A).

Transducers



Note: Turn off nitrogen gas supply, liquid nitrogen supply and empty the liquid nitrogen chamber before performing setup procedure.



The system uses three pressure transducers:

- Gas Supply - Nitrogen gas used to operate pneumatic liquid nitrogen inlet valve and system purge
- Level HP - Reads the level of liquid nitrogen in the chamber
- Level LP - Provides a chamber headspace pressure offset for Level HP

The Transducer Setup procedure is to zero calibrate the pressure transducer. Therefore, all nitrogen gas pressure needs to be removed from the system and liquid nitrogen needs to be removed from the chamber.

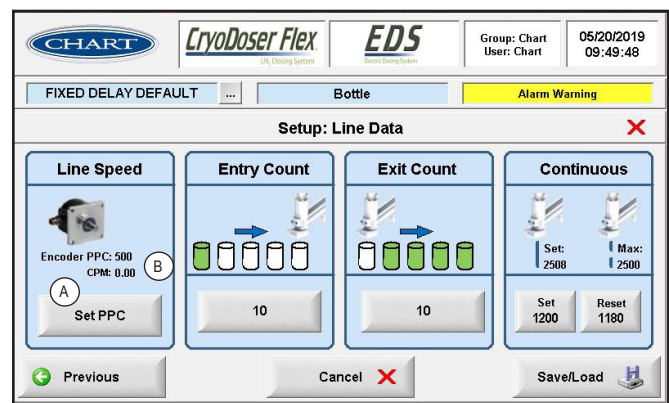
Zero Calibration

- To zero all sensors - In the “All Sensors” window select the “Set Zero” button (A).
- To zero individual sensors - In the desired sensor window select the “Set Zero” button (B).

Reset Zero Calibration

- To reset all sensors - In the “All Sensors” window select the “Reset Zero” button (C).
- To reset individual sensors - In the desired sensor window select the “Reset Zero” button (D).

Select the “Next” button (E)



PPC - Line Speed Resolution Setup (Line Speed Sensor or User Input enabled).

1. Turn on the dosing line at low speed
2. Select the “Set Encoder PPC” button (A)
3. Compare the Position Speed Ref CPM to the actual line speed, if adjustment is necessary, select the “PPC Setpoint” entry button (B) to fine tune the line speed display

PPC - Line Speed Resolution Setup (Line Speed Sensor Not Used)

- The system will use the Timing Sensor for line speed reference and automatically set PPC = 1, see PPC Line Speed Resolution chart on previous page for Response/Container results

Select the “Save/Load” button (C)

Line Data

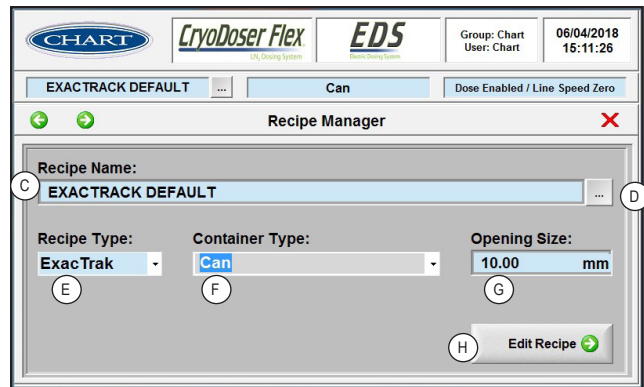
1. Line Speed/Encoder — Set PPC is used to match line speed of the dosing unit to the filling line. The encoder is factory set at 500 pulses per shaft revolution.
2. Entry/Exit Count — These buttons set the number of actuations that will take place before the container detect sensor actually senses the first container and at the end sets the number of actuations after the last container is detected by the container sensor. This is done in order to “pre-cool” the nozzle area to ensure good nitrogen flow.
3. Continuous — Sets the speed values to determine when the actuator will switch from individual (discrete) dosing to a continuous flow of liquid nitrogen and back to discrete.

Recipe Setup

The CryoDoser FlexTM LN₂ Dosing System Pack Premier Controller is recipe based where each recipe has a unique name given by the user. The user will create recipes for ExacTrackTM Superior Dosing Accuracy dosing/service, Fixed Delay dosing/service and Service. Each recipe sets specific product parameters to enhance machine performance for each product. After creating the recipes the user will then load the desired recipe for dosing or service operation.



From the menu select the “Recipe Manager” button (A) or (B)



Enter a new “Recipe Name” (C) or select an existing recipe from the dialog box button (D), select recipe in the dialog box and select open.

Select the “Recipe Type” (E):

- ExacTrack - Speed compensated dosing system
- Fixed Delay - Timing delay and dose duration setpoints are the same at any speed
- Service - System purge

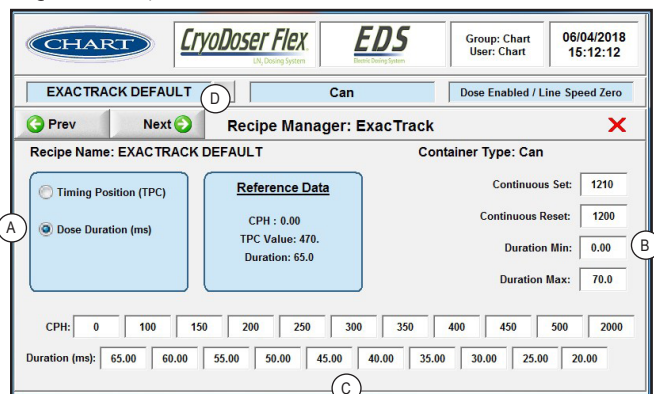
Select the “Container Type” (F).

Set the container “Opening Size” (G).

Select the “Edit Recipe” button (H)

ExacTrackTM Superior Dosing Accuracy Recipe Setup

ExacTrack dosing monitors the container line speed and adjusts timing delay and dose duration as speed increases or decreases. ExacTrack dosing allows the user to precisely tune the dosing system giving a more consistent dose result in each container. A typical ExacTrack system consists of three sensors, detect sensor, timing sensor and speed sensor (contact the Chart sales team for specific sensor requirements).



Select the “Timing Position” button (A).

Set the line speed “CPM Min” and “CPM Max” setpoints (B) (default min = 0, max = 2500).

Set the timing CPM and TPC setpoints (C)

Adjust the “Trigger Offset” (B). Trigger offset is used to advance or retard the timing profile. Adjust to fine tune dose target.

Select the “Dose Duration” button (A).

Set the “Continuous Set/Reset” values (B) (default Set = 2500, Reset = 2490).

- Continuous Set - When line speed is faster than this value, the system will go into continuous dose
- Continuous Reset - If the system is in continuous dose the system will resume discrete dosing when the line speed drops below this value

Set the “Duration Min/Max” values (B), this is the minimum and maximum values the operator can enter during dose operation.

Set the dose duration CPM and Duration (ms) setpoints (C).

- CPM fields set the line speed span between which the dose duration setpoint is active
- Duration fields set the liquid nitrogen discrete dose duration time where the set point is active between the CPM set values.

Example: 19ms duration is active between line speed CPM 0 to CPM 200 and 18ms duration is active between line speed CPM 200 and 400.

Select the “Next” button (D) to go to the next page.

Fixed Delay Recipe Setup

Fixed Delay is a fixed time based system where the Delay and Duration set points are set for each target. The user can have a single target (1) or up to ten sequential targets (2), each target has its own delay and duration set points.

Select the “Step” button (A) and enter the number of targets to be sequentially dosed.

Select the “Delay (ms)” button (B) that corresponds with the target number. Enter the trigger to head delay.

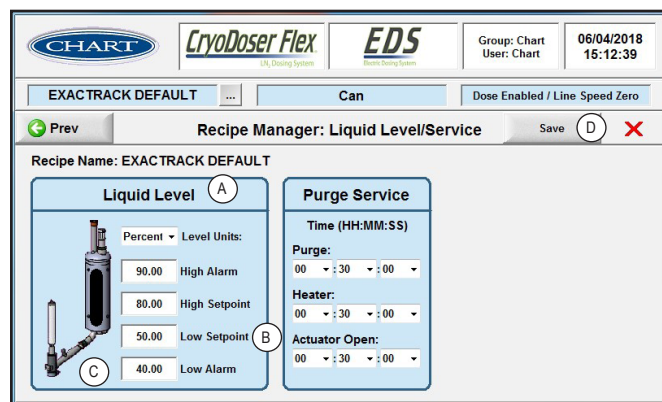
Select the “Duration (ms)” button (B) that corresponds with the target number. Enter the dose duration value.

Select the “Next” button (C) to continue setup.

Liquid Level and Service (Purge)

The CryoDoser Flex™ LN₂ Dosing System allows the user to set the liquid nitrogen level to specific depth in the holding tank. Reducing the liquid level depth will reduce the dose nozzle liquid pressure providing a softer dose. Filling the liquid level to maximum depth will increase the dose nozzle liquid pressure providing a higher volume with a lower duration.

The CryoDoser Flex Pack Premier Controller system can be setup with a semi-auto purge service or a scheduled purge service. Semi-Auto purge allows the operator to set the purge duration time and can be turned on or off by the operator. Scheduled purge can be setup to purge at a specified date, time and duration. It is recommended that the system is purged after each dosing process when the unit is drained and put into a stand-by or shutdown state.



Liquid Level Setup

Select the “Level Units” pull-down (A), select the desired reference units (psi, mbar, bar or Pascal).

Select the “High Setpoint” value (B), enter liquid level high value.

Select the “Low Setpoint” value (B), enter liquid level low value (typically 10-15 points less than high level).

Select the “High Alarm” value (B), enter liquid level high alarm value.

Select the “Low Alarm” value (B), enter liquid level low alarm value.

Enable “Auto Drain” (C) if you want the system to drain the holding tank if the new set point value is lower than the current level.



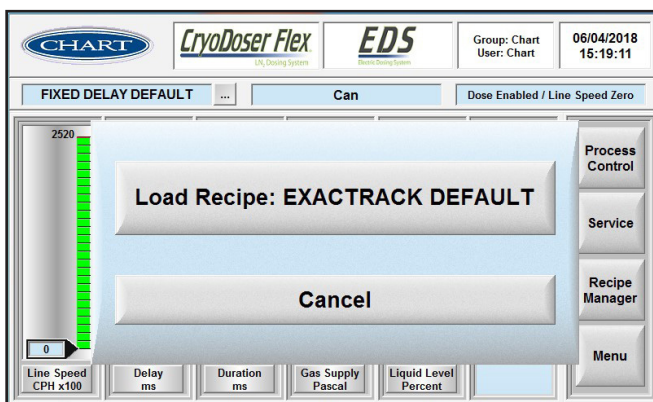
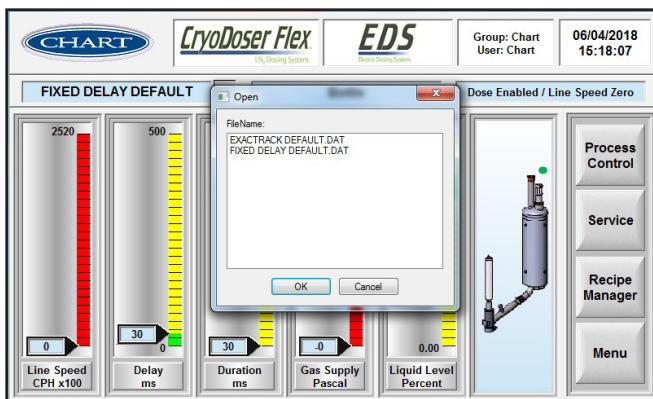
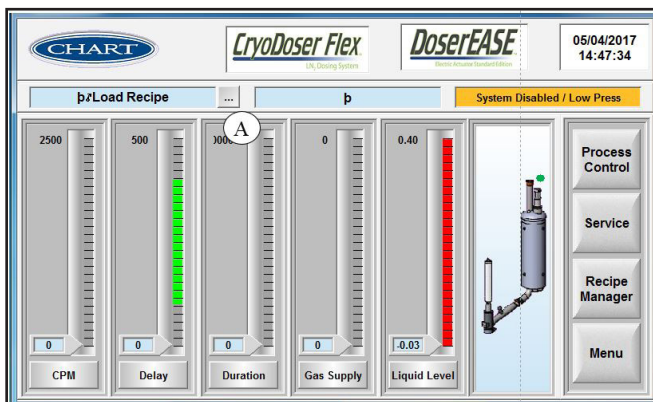
Warning! Auto Drain releases liquid through the dosing head. Do not use Auto Drain if this could cause damage.

Select the “Save” button (D).

Recipe Load

After a recipe has been created, loading takes place from the main screen. A pull-down box (“A”) is selected to then show a separate window. Locate the recipe and select using a stylus or finger. Press OK once selected.

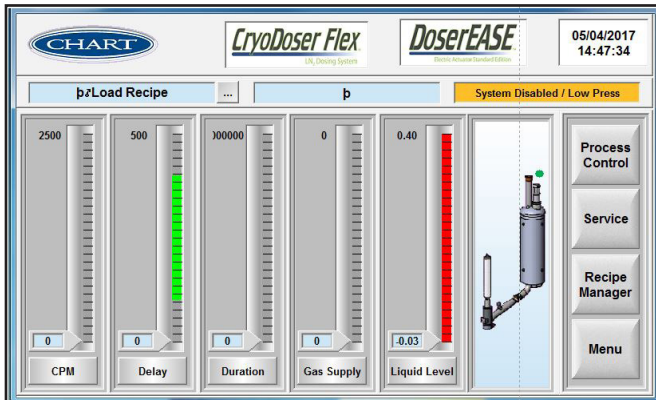
The Load Recipe button will then allow the user to press and load the Recipe.



Dose Process

After setting up a recipe either in ExacTrack or Fixed delay, the dose duration can be checked on the main screen. Both the dose duration and dose delay are shown in a bar graph based on speed range if in ExacTrack or shown as a constant value when in Fixed Delay.

The dose may be temporarily halted by pressing the dose enable/disable button (A) on the front of the Control Box. Dose is enabled when the button is pulled out and the light is on.

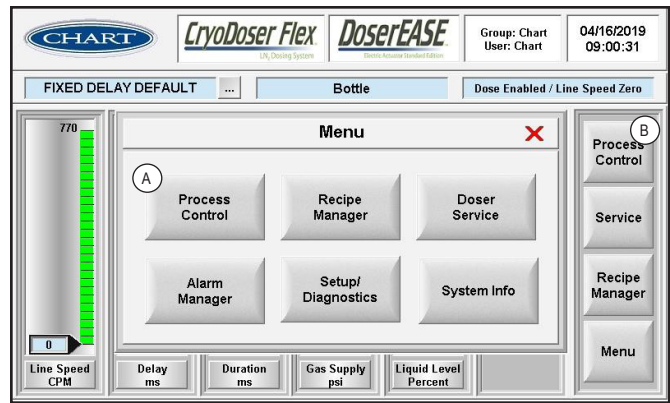


Real-Time Monitoring

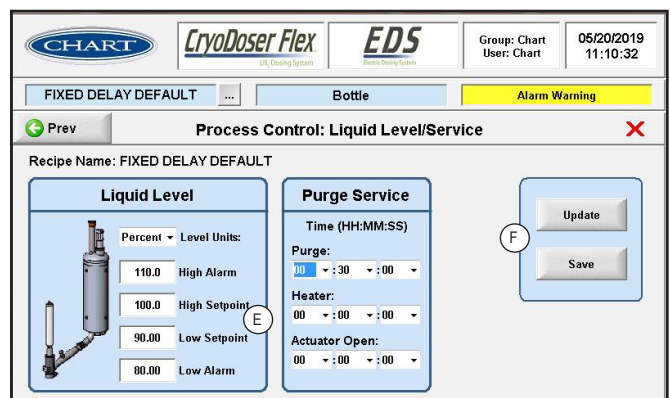
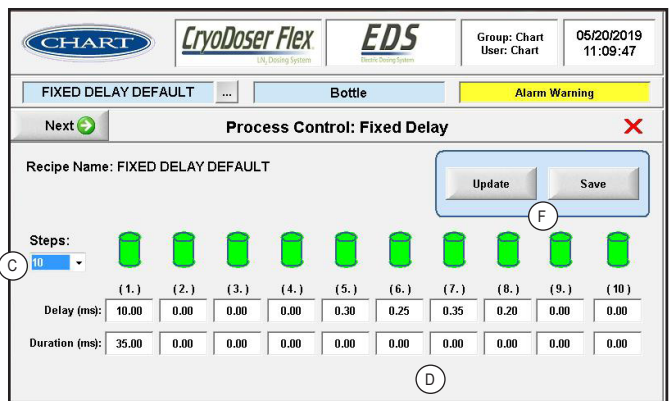
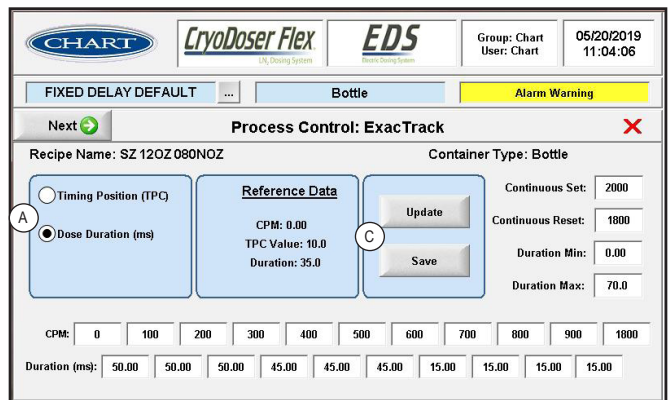
A user can see what the dosing system is doing by selecting Process Control. The user can experiment with all parameters; dose duration, timing, levels, etc. without affecting a recipe.

Access Process Control from the menu screen, either button (A) or (B). The system will bring up the recipe that is currently being run. The user may then select to modify a parameter; duration for example by selecting the Dose Duration bubble (A) on the process Control ExacTrack screen, then change the duration time for any speed range. Choosing the Update Button (C) will update the changes made to duration in the previous step.

The same process is used if the system is in Fixed Delay to select number of steps (C), Duration (D) or for Liquid Level and Service functions (E). Select (F) to update.



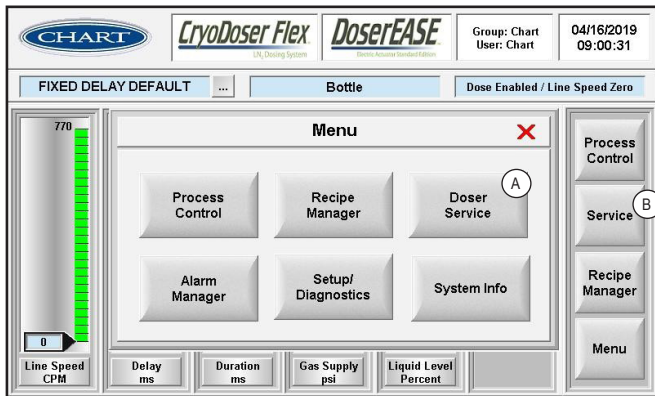
From the menu select "Process Control" (A) or (B).



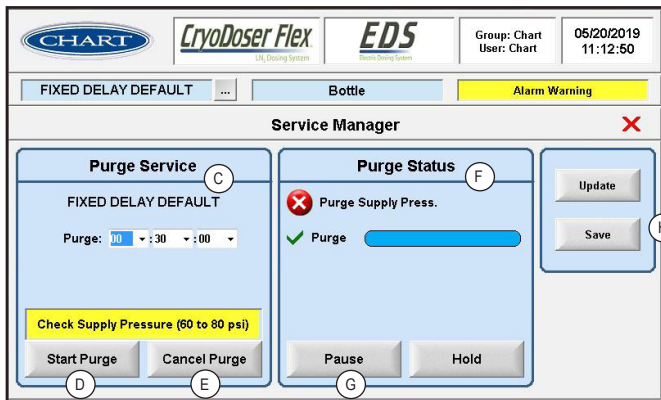
Service (Purge)

Purging is a critical component of liquid nitrogen dosing. Purging is done with nitrogen gas (GN₂) and is required to minimize moisture accumulation in the system. Purging must be part of any/all SOP (Standard Operating Procedures) prior to system start-up, at system shut-down and when necessary as freeze-ups occur. Access the Service screen from the main screen at either (A) or (B).

ExacTrack or Fixed Delay purge in hours and minutes as shown in (C), and to start, the user presses button (D). Purging can be cancelled at any time or paused by pressing the applicable buttons (E) or (G). A time bar shows elapsed purging time by starting completely in color then disappearing as time elapses.



From the menu select “Doser Service” (A) or (B).



System Diagnostics

The Pack Premier system allows for a manual check of all items that make up the dosing unit and components, including: solenoid valves used to provide gas input for system fill and purging or dose actuator as examples.

Access the diagnostics screen from the menu page; Setup/ Diagnostics (A). Start I/O test from the button (C). Doing so will disable all automatic functions and allow user to manually actuate any of the individual functions shown, including any alarm warnings (D) plus other components shown. Within I/O test screen, user can also check on status of the system looking at column (E). If highlighted, each field shows the part that is active. For example, if the timing sensor is activated, the field will change color from blue to green.



From the menu select “Setup/Diagnostics” (A). In the Setup/ Diagnostics menu, press I/O Test Button.

