

TR88.00.02 / PackML Solutions

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TR88.00.02 / PackML Planning Concepts

Two possible cases can occur at the OEM:

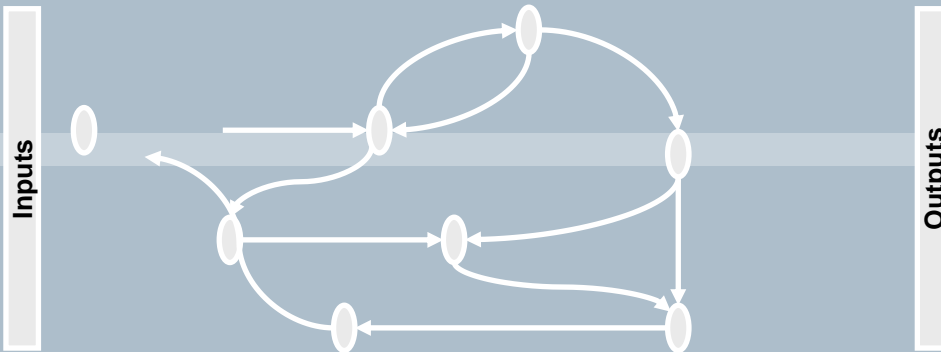
1

2

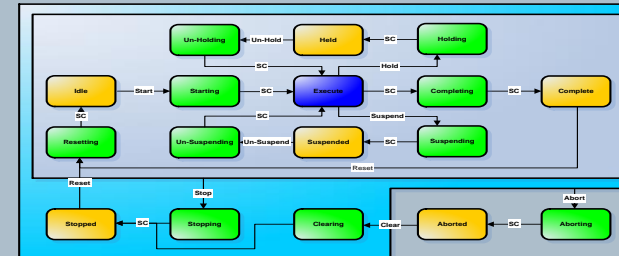
Application with existing code and data
(PackTags only)

PackTags

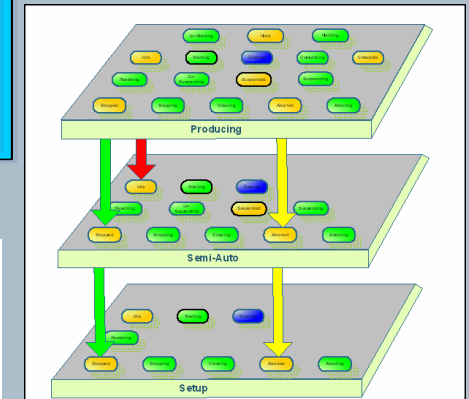
Settings



Starting from scratch
(Full PackML implementation)



Prefix	Tag Name*	Tag Descriptor	Data Type	Units	Range
PML	Cur Mode	Current Mode	Integer		
PML	Mode_Time	Mode Time	Time		HH:MM:SS.SS
PML	Cum_Time_Modes	Cumulative Time in All Modes	Structure		
PML	Cur State	Current State	Integer		
PML	State_Time	State Time	Time		HH:MM:SS.SS
PML	Cum_Time_States	Cumulative Time in All States	Structure		
PML	State_Transition	State Transition	Structure		
PML	Ext_Tripout	External Trigger	Structure		
PML	Cur Mach Spd	Current Machine Speed	Real	Packs/Min	
PML	Mach_Design_Spd	Machine Design Speed	Real	Packs/Min	
PML	Prod_Processed	Number Products Processed	Integer	Products	
PML	Pack_Processed	Number Packages Processed	Integer	Packs	
PML	Defect_Prod	Number Defective Products	Integer	Products	
PML	Defect_Pack	Number Defective Packages	Integer	Packs	
PML	Prod_Ratio	Ratio (products per package)	Integer	Products/Pack	
PML	Mach_Cycle	Machine Cycle	Integer		
PML	Mat_Ready	Materials Ready	Boolean		
PML	Mat_Runout	Material Runout	Boolean		



TR88.00.02 / PackML Design Approaches for a Full TR88 Solution 2

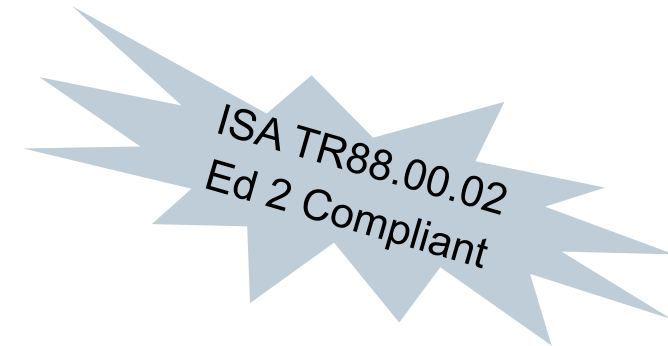
Available Templates

1. Basic Template (LPMLV30 library):

- TR88 (PackML) Mode Manager / State Model Function Block (FB) & PackTags Data Block (DB)
- HMI Template
- Programming language independent (i.e. LAD, ST/SCL,...)
- Available for SIMATIC S7-300/400, S7-1200/1500, SIMOTION
- Globally available via Siemens Service & Support website (<https://support.industry.siemens.com/cs/ww/en/view/49970441>)

2. CPG Template:

- Based upon open source template from global CPG Co. (based upon LAD)
- Builds upon “Basic Template” (LPMLV30 library) with the following added features:
 - HMI Template (CPG philosophy)
 - Integrated Alarms & Warnings (Code and HMI)
 - Integrated PackML command / status philosophy (Code)
 - S88/Make2Pack Equipment Module (EM) & Control Module (CM) Support
 - OEE (based upon TR88.00.02) (Code and HMI)
 - Multi-Lingual support (up to x Western languages, Unicode support pending)
- Available for SIMATIC S7-300/400, S7-1200/1500, SIMOTION



TR88.00.02 / PackML Design Approaches for a Full TR88 Solution

Available Documentation & Training

2

1. Basic Template:

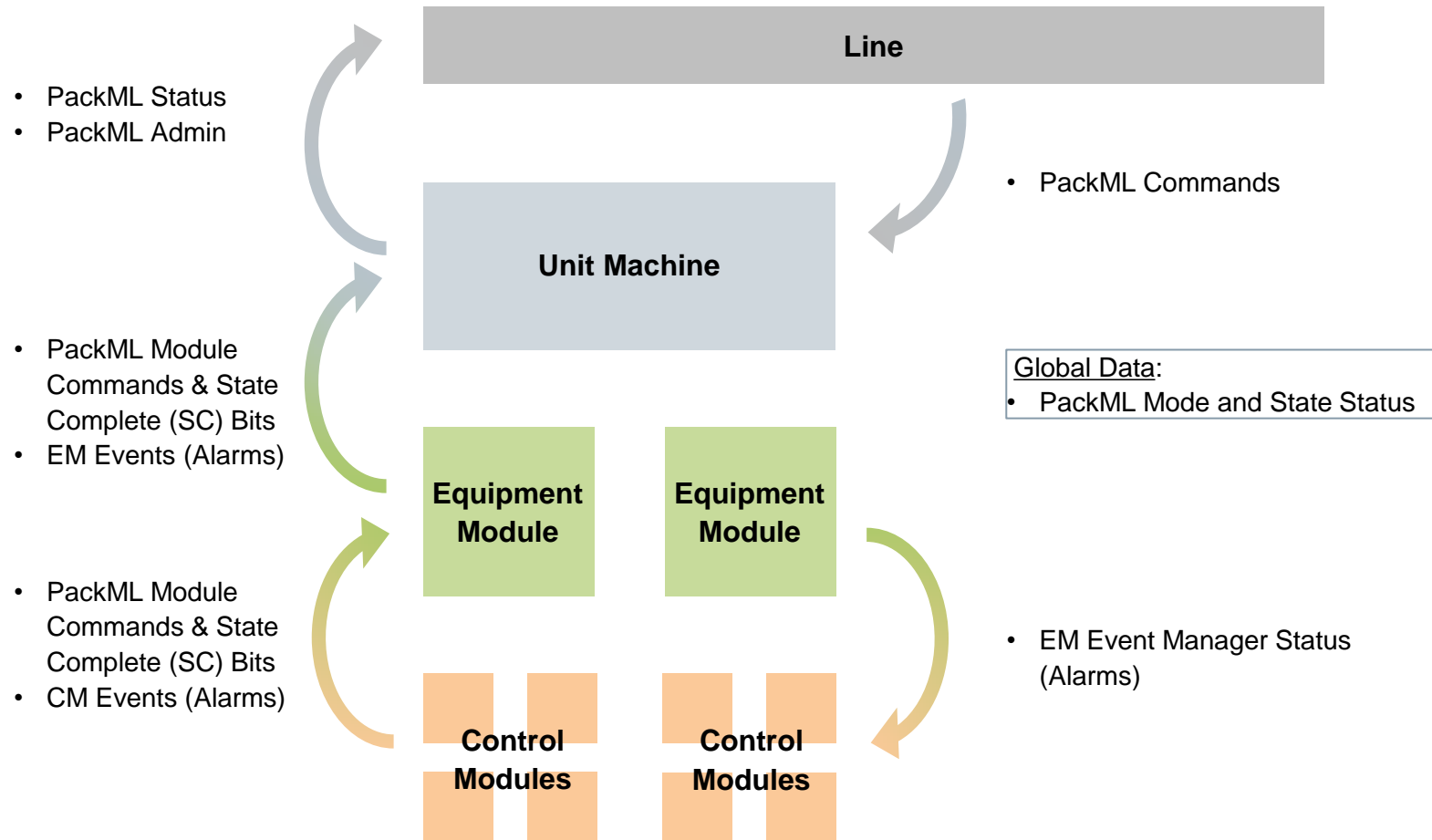
- Mode Manager / State Model FB User's Manual (PDF)
- HMI Style Guide User's Manual (PDF)

2. CPG Template:

- Solution / PackML Implementation Guide
- PackML Planning Guide
- PackML FB's (used for CPG)
- Event Handling (alarm, warnings, operator guidance)
- Troubleshooting / Maintenance

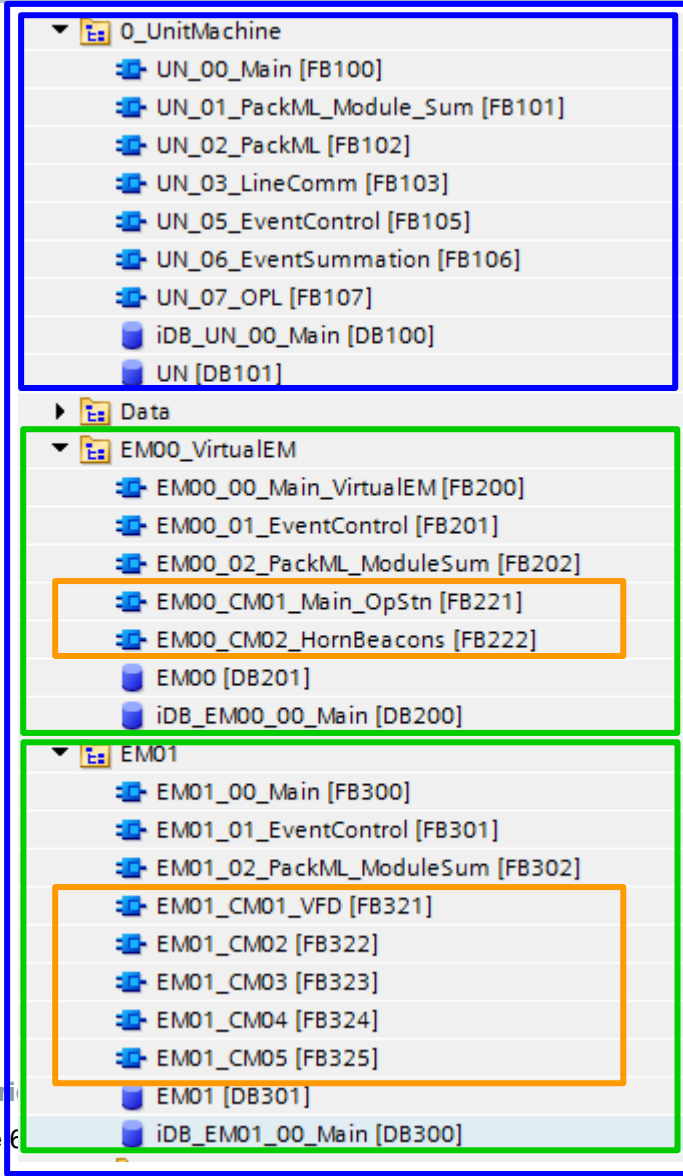
Machine Template Overview*

Data Flow



Machine Template Overview*

Modular Programming Structure



Unit Machine

Equipment Module(s)

Control Module(s)

Version shown:

- TIA Portal version for SIMATIC S7-1500 PLC's
- Other versions vary

* Based up P&G PackML Template (open source)

Machine Template Overview*

Modular Programming Structure

0_UnitMachine

- UN_00_Main [FB100]
- UN_01_PackML_Module_Sum [FB101]
- UN_02_PackML [FB102]
- UN_03_LineComm [FB103]
- UN_05_EventControl [FB105]
- UN_06_EventSummation [FB106]
- UN_07_OPL [FB107]
- iDB_UN_00_Main [DB100]
- UN [DB101]

Data

EM00_VirtualEM

- EM00_00_Main_VirtualEM [FB200]
- EM00_01_EventControl [FB201]
- EM00_02_PackML_ModuleSum [FB202]
- EM00_CM01_Main_OpStn [FB221]
- EM00_CM02_HornBeacons [FB222]
- EM00 [DB201]
- iDB_EM00_00_Main [DB200]

EM01

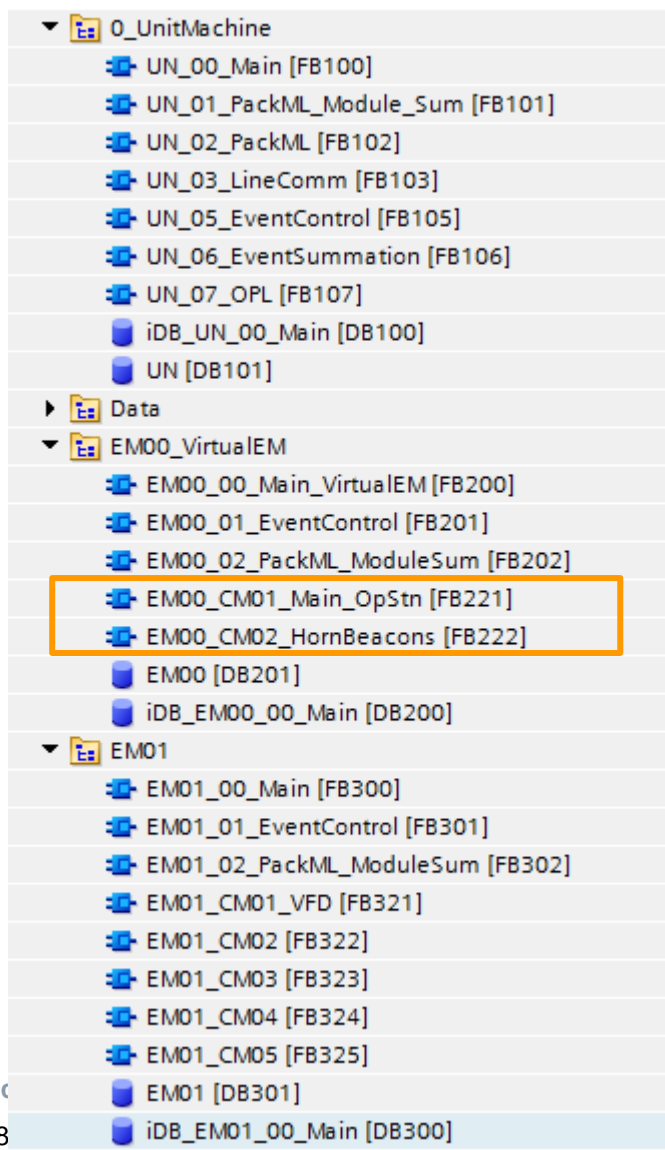
- EM01_00_Main [FB300]
- EM01_01_EventControl [FB301]
- EM01_02_PackML_ModuleSum [FB302]
- EM01_CM01_VFD [FB321]
- EM01_CM02 [FB322]
- EM01_CM03 [FB323]
- EM01_CM04 [FB324]
- EM01_CM05 [FB325]
- EM01 [DB301]
- iDB_EM01_00_Main [DB300]

Equipment Module(s)

- Summarizes PackML commands and state completes from all control modules
- Summarizes events (alarms and warnings) from all control modules
- CPG Template consist of 3 EM's configure
- CPG Library* consist of 12 configured EM's

Machine Template Overview*

Modular Programming Structure



Control Module(s)

- All programming related to control module exists within the 1 folder
 - Logic
 - Event Handling (Alarms and Warnings)
 - PackML Command and Status
- CPG Template consist of 10 CM's configured per EM.

HMI

State Model Overview

SIEMENS SIMATIC HMI

Machine Warnings: First Fault Alarm:

8/14/2015 5:59 PM

Mode: Production
State: Execute

TOUCH

TR88.00.02 / PackML
State Model Overview

OMAC State Model | PackML Times | OEE

Idle → Start → Starting → SC → Execute → SC → Completing → SC → Complete
 Execute → Hold → Holding → SC → Held → UnHold → UnHolding → SC → Execute
 Execute → Suspend → Suspending → SC → Suspended → UnSuspend → UnSpnding → SC → Execute
 Complete → Reset → Idle
 Complete → Abort → Aborting → SC → Aborted → Clear → Clearing → SC → Stopping → SC → Stopped → Reset → Idle

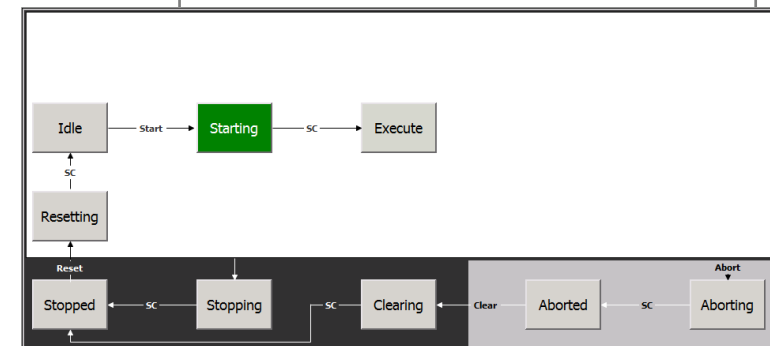
Operator Information:

ID:	Message:	Time In:
0		
0		
0		
0		
0		

Hold II

Start I Stop O Reset X

- ### PackML
- Dynamic State Model Animation (based upon configuration of the selected mode)
 - PackML Diagnostics Messages (operator action feedback)



HMI

PackML Mode and State Times

Machine Warnings | First Fault Alarm: | 8/14/2015 5:59 PM

TR88.00.02 / PackML
Mode & State Times:

OMAC State Model | PackML Times | OEE

Mode	Last Time	Cum Time	% Time in Mode
Production	5.38	5.52	<div style="width: 10%;"></div>
Maintenance	0.00	0.00	<div style="width: 0%;"></div>
Manual	0.58	39.22	<div style="width: 85%;"></div>
User Mode 1	0.00	0.00	<div style="width: 0%;"></div>

(All times shown in MIN)

Time Since Last Reset: 44.73

Reset Timers

State	Last Time	Cum Time	% Time in State
Clearing	0.07	0.12	<div style="width: 5%;"></div>
Stopped	0.00	1.30	<div style="width: 10%;"></div>
Starting	0.05	0.05	<div style="width: 5%;"></div>
Idle	0.07	0.12	<div style="width: 5%;"></div>
Suspended	0.00	0.00	<div style="width: 0%;"></div>
Execute	2.05	2.05	<div style="width: 15%;"></div>
Stopping	0.00	0.00	<div style="width: 0%;"></div>
Aborting	0.07	0.12	<div style="width: 5%;"></div>
Aborted	1.47	1.62	<div style="width: 10%;"></div>
Holding	0.00	0.00	<div style="width: 0%;"></div>
Held	0.00	0.00	<div style="width: 0%;"></div>
UnHolding	0.00	0.00	<div style="width: 0%;"></div>
Suspending	0.00	0.00	<div style="width: 0%;"></div>
UnSuspending	0.00	0.00	<div style="width: 0%;"></div>
Resetting	0.05	0.15	<div style="width: 5%;"></div>
Completing	0.00	0.00	<div style="width: 0%;"></div>
Complete	0.00	0.00	<div style="width: 0%;"></div>

Mode: Production
State: Execute

Machine Control
Settings
Alarms & Events
Statistics
Manual
Diagnostics
Formats

Start (I) Stop (O) Reset (X)

Times

- Preconfigured
- Dynamic status of active PackML State
- Current & Cumulative time values
- Bar Graph - % time of each state

HMI

PackML Alarms & Warnings

Machine Warnings | First Fault Alarm: EM00 OpStation Stop PB | 8/14/2015 5:57 PM

Alarms & Events Summary

TR88 Alarms | TR88 Alarms 1st Fault History | TR88 Warnings | Safety View (Event TEST PAGE) | HMI Active & Cleared Alarms

Active Alarms:

#	ID:	Cat:	Message:	Time In:	Time Out:
1	0	0			
2	0	0			
3	0	0			
4	0	0			
5	0	0			

Stop Reason Alarm History:

#	ID:	Cat:	Message:	Time In:	Time Out:
1	33	2	EM00 OpStation Stop PB	8/14/2015 9:52:38 PM	1/1/1990 12:00:00 AM
2	33	2	EM00 OpStation Stop PB	8/6/2015 7:48:05 PM	8/14/2015 9:14:04 PM
3	34	7	EM00 OpStation Hold PB	8/6/2015 7:47:35 PM	8/6/2015 7:47:53 PM
4	34	7	EM00 OpStation Hold PB	8/6/2015 7:47:02 PM	8/6/2015 7:47:16 PM
5	34	7	EM00 OpStation Hold PB	8/6/2015 7:46:22 PM	8/6/2015 7:46:31 PM

Active Warnings:

#	ID:	Message:	Time In:	Time Out:
1	0			
2	0			
3	0			
4	0			
5	0			

Mode: Production | State: Starting

Machine Control | Settings | Alarms & Events | Statistics | Manual | Diagnostics | Formats

Start (I) | Stop (O) | Reset (X)

Alarms / Warnings

- Preconfigured
- Seprerate Alarm, Stop Reason Alarm History, and Warning sections

HMI

PackML Alarms & Warnings - Filtering

The screenshot displays the SIMATIC HMI interface for TR88 Machine Alarms. At the top, it shows 'Machine Warnings' and 'First Fault Alarm: EM00 OpStation Stop PB'. The main title is 'TR88 Machine Alarms Active Alarms'. Below this, there are navigation tabs: 'TR88 Alarms', 'TR88 Alarms 1st Fault History', 'TR88 Warnings', 'Safety View (Event TEST PAGE)', and 'HMI Active & Cleared Alarms'. A filter section includes 'Filter Category' (set to '(0) - E-Stop'), 'Filter Active Events', 'Sort By Time', and 'Sort by Category'. The main table lists active alarms with columns for ID, Category, Message, Time In, and Time Out. Below the table is a 'Filter:' section with buttons for Unit (EM01, EM03, EM00 Virtual EM, EM02). On the right, a vertical menu includes 'Machine Control', 'Settings', 'Alarms & Events', 'Statistics', 'Manual', 'Diagnostics', and 'Formats'. At the bottom right, there are 'Start', 'Stop', and 'Reset' buttons with corresponding symbols (I, O, X).

ID:	Cat:	Message:	Time In:	Time Out:
33	2	EM00 OpStation Stop PB	8/14/2015 9:59:56 PM	8/14/2015 9:59:56 PM
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			
0	0			

Alarms / Warnings

- Filtering by:
 - Active / Cleared
 - Category
 - Time
- Dynamic EM Filtering
 - Operator Selectable

TR88.00.02 / PackML Solutions Contact Information



Mike Pieper

Industry Manager - Packaging
Siemens US DF FA APC

4620 Forest Ave.
Cincinnati, OH, USA 45212

Phone: +1 (513) 841-3452

E-mail:

mike.pieper@siemens.com

Ajay S Rana

Business Developer –Packaging
Siemens US DF FA PMA

5300 Triangle Parkway, Norcross,
GA, USA 30092

Cellular: +1 (678) 910-6393

E-Mail:

ajay.rana@siemens.com