



Screen-wise Field Details

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Utility Billing System

Notes

1. **Read-only Fields:** Fields marked as "Read-only" are displayed for information purposes and cannot be edited by the user.
2. **Auto Fields:** Fields marked as "Auto" are automatically generated or calculated by the system and do not require user input.

1. Login Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Email	String	Yes	Valid email format	Users
Password	Password	Yes	Minimum 6 characters	Users

2. Register Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Name	String	Yes	Max 100 characters	Users
Email	String	Yes	Unique, valid email format	Users
Password	Password	Yes	Minimum 6 characters	Users

3. Admin – User Management Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Name	String	Yes	Max 100 characters	Users

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Email	String	Yes	Unique, valid email format	Users
Password	Password	Yes (Create only)	Minimum 6 characters	Users
Role	String (Enum)	Yes	Admin, Billing Officer, Account Officer, Consumer	Users
Status	String	Yes	Active, Inactive	Users

4. Admin – Utility Type Management Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Name	String	Yes	Unique name, Max 100 characters	UtilityTypes
Description	String	Yes	Max 500 characters	UtilityTypes
Status	String	Yes	Enabled, Disabled	UtilityTypes
BillingCycleId	String	No	Valid billing cycle ID	UtilityTypes, BillingCycles

5. Admin – Tariff Management Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Name	String	Yes	Max 100 characters	Tariffs
UtilityTypeId	String	Yes	Valid utility type ID	Tariffs, UtilityTypes
BaseRate	Decimal	Yes	Value >= 0	Tariffs
FixedCharge	Decimal	Yes	Value >= 0	Tariffs
TaxPercentage	Decimal	Yes	Value >= 0 and <= 100	Tariffs

6. Admin – Billing Cycle Management Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Name	String	Yes	Max 100 characters	BillingCycles
GenerationDay	Integer	Yes	Value between 1-31	BillingCycles
DueDateOffset	Integer	Yes	Value >= 0 (days after generation)	BillingCycles
GracePeriod	Integer	Yes	Value >= 0 (days)	BillingCycles
IsActive	Boolean	Yes	true/false	BillingCycles

7. Admin – Connection Management Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
UserId	String	Yes	Valid user ID	Connections, Users
UtilityTypeId	String	Yes	Valid utility type ID	Connections, UtilityTypes
TariffId	String	Yes	Valid tariff ID	Connections, Tariffs
MeterNumber	String	Yes	Unique meter number	Connections
Status	String	Yes	Active, Inactive	Connections

8. Admin – Utility Request Management Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
RequestId	String	Auto	System generated	UtilityRequests
UserId	String	Read-only	—	UtilityRequests, Users
UtilityTypeId	String	Read-only	—	UtilityRequests, UtilityTypes
Status	String	Read-only	Pending, Approved, Rejected	UtilityRequests
RequestDate	DateTime	Read-only	—	UtilityRequests
TariffId	String	Yes (Approval)	Valid tariff ID	UtilityRequests, Tariffs

Field Name	Data Type	Mandatory	Validation Rules	Related Table
MeterNumber	String	Yes (Approval)	Unique meter number	UtilityRequests

9. Billing Officer – Meter Reading Entry Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
ConnectionId	String	Yes	Valid connection ID	MeterReadings, Connections
ConsumerName	String	Read-only	—	MeterReadings, Connections, Users
UtilityName	String	Read-only	—	MeterReadings, Connections, UtilityTypes
MeterNumber	String	Read-only	—	MeterReadings, Connections
PreviousReading	Decimal	Read-only	—	MeterReadings
CurrentReading	Decimal	Yes	Value >= PreviousReading, >= 0	MeterReadings
ReadingDate	DateTime	Yes	Date <= Today	MeterReadings
TariffId	String	Yes	Valid tariff ID	MeterReadings, Tariffs

10. Billing Officer – Bill Generation Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
ReadingId	String	Yes	Valid meter reading ID	Bills, MeterReadings
ConnectionId	String	Read-only	—	Bills, Connections
BillingPeriod	String	Auto	System generated (Month Year)	Bills
GenerationDate	DateTime	Auto	System generated	Bills

Field Name	Data Type	Mandatory	Validation Rules	Related Table
DueDate	DateTime	Auto	Calculated from billing cycle	Bills
PreviousReading	Decimal	Read-only	—	Bills, MeterReadings
CurrentReading	Decimal	Read-only	—	Bills, MeterReadings
Consumption	Decimal	Auto	CurrentReading - PreviousReading	Bills
BaseAmount	Decimal	Auto	Calculated from consumption and tariff	Bills
TaxAmount	Decimal	Auto	Calculated from base amount and tax %	Bills
FixedCharge	Decimal	Auto	From tariff	Bills
PenaltyAmount	Decimal	Auto	Calculated if overdue	Bills
TotalAmount	Decimal	Auto	BaseAmount + TaxAmount + FixedCharge + PenaltyAmount	Bills
Status	String	Auto	Generated	Bills

11. Consumer – Payment Screen

Field Name	Data Type	Mandatory	Validation Rules	Related Table
BillId	String	Yes	Valid unpaid bill ID	Payments, Bills
PaymentMethod	String	Yes	Cash or Online	Payments
ReceiptNumber	String	Conditional	Required if PaymentMethod = Cash	Payments
UpId	String	Conditional	Required if PaymentMethod = Online	Payments
Amount	Decimal	Read-only	Bill total amount	Payments, Bills

12. Consumer – View Bills Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
BillId	String	Read-only	—	Bills
BillingPeriod	String	Read-only	—	Bills
UtilityName	String	Read-only	—	Bills, Connections, UtilityTypes
MeterNumber	String	Read-only	—	Bills, Connections
PreviousReading	Decimal	Read-only	—	Bills
CurrentReading	Decimal	Read-only	—	Bills
Consumption	Decimal	Read-only	—	Bills
BaseAmount	Decimal	Read-only	—	Bills
TaxAmount	Decimal	Read-only	—	Bills
FixedCharge	Decimal	Read-only	—	Bills
PenaltyAmount	Decimal	Read-only	—	Bills
TotalAmount	Decimal	Read-only	—	Bills
GenerationDate	DateTime	Read-only	—	Bills
DueDate	DateTime	Read-only	—	Bills
Status	String	Read-only	Generated, Due, Paid, Overdue	Bills

13. Consumer – Payment History Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
PaymentId	String	Read-only	—	Payments
BillId	String	Read-only	—	Payments, Bills
PaymentDate	DateTime	Read-only	—	Payments
Amount	Decimal	Read-only	—	Payments
PaymentMethod	String	Read-only	Cash, Online	Payments
ReceiptNumber	String	Read-only	—	Payments
UpId	String	Read-only	—	Payments

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Status	String	Read-only	Completed, Failed	Payments
UtilityName	String	Read-only	—	Payments, Bills, Connections, UtilityTypes
BillingPeriod	String	Read-only	—	Payments, Bills

14. Consumer – Consumption Details Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
Month	String	Read-only	—	MeterReadings
UtilityName	String	Read-only	—	MeterReadings, Connections, UtilityTypes
Consumption	Decimal	Read-only	—	MeterReadings
EstimatedCost	Decimal	Read-only	—	Calculated

15. Consumer – Dashboard Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
OutstandingBalance	Decimal	Read-only	—	Bills (calculated)
MonthlySpending	Decimal	Read-only	—	Payments (calculated)
ActiveConnections	Integer	Read-only	—	Connections (count)
DueBillsCount	Integer	Read-only	—	Bills (count)
ConsumptionTrend	Array	Read-only	—	MeterReadings (grouped by month)

16. Account Officer – Track Payments Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
PaymentId	String	Read-only	—	Payments
PaymentDate	DateTime	Read-only	—	Payments
ConsumerName	String	Read-only	—	Payments, Bills, Connections, Users
UtilityName	String	Read-only	—	Payments, Bills, Connections, UtilityTypes
Amount	Decimal	Read-only	—	Payments
PaymentMethod	String	Read-only	Cash, Online	Payments
Reference	String	Read-only	ReceiptNumber or Upild	Payments

17. Account Officer – Outstanding Balances Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
BillId	String	Read-only	—	Bills
ConsumerName	String	Read-only	—	Bills, Connections, Users
UtilityName	String	Read-only	—	Bills, Connections, UtilityTypes
BillMonth	String	Read-only	—	Bills
Amount	Decimal	Read-only	—	Bills
Status	String	Read-only	Due, Overdue, Generated	Bills
DueDate	DateTime	Read-only	—	Bills

18. Account Officer – Consumer Billing Summary Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
ConsumerId	String	Read-only	—	Users
ConsumerName	String	Read-only	—	Users
TotalBilled	Decimal	Read-only	—	Bills (Sum)
TotalPaid	Decimal	Read-only	—	Bills (Sum where Status = Paid)
OutstandingBalance	Decimal	Read-only	—	Bills (Sum where Status != Paid)
OverdueCount	Integer	Read-only	—	Bills (Count where Status = Overdue)

19. Account Officer – Dashboard Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
TotalRevenue	Decimal	Read-only	—	Payments (Sum)
OutstandingDues	Decimal	Read-only	—	Bills (Sum where Status != Paid)
UnpaidBillsCount	Integer	Read-only	—	Bills (Count where Status != Paid)
TotalConsumption	Decimal	Read-only	—	MeterReadings (Sum)
RecentPayments	Array	Read-only	—	Payments (Last 5)
OutstandingByUtility	Array	Read-only	—	Bills (Grouped by UtilityType)

20. Admin – Reports Screen (Display Only)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
TotalConsumers	Integer	Read-only	—	Users (Count where Role = Consumer)

Field Name	Data Type	Mandatory	Validation Rules	Related Table
ActiveBillingOfficers	Integer	Read-only	—	Users (Count where Role = BillingOfficer)
ActiveAccountOfficers	Integer	Read-only	—	Users (Count where Role = AccountOfficer)
PendingUtilityRequests	Integer	Read-only	—	UtilityRequests (Count where Status = Pending)
ConnectionsByUtility	Array	Read-only	—	Connections (Grouped by UtilityType)